

FIRE MANAGEMENT PLAN

Benton Lake National wildlife Refuge Complex

including

Benton Lake National Wildlife Refuge
and
Benton Lake Wetland Management District

Great Falls, Montana

United States Department of the Interior
Fish and Wildlife Service

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Figure 1: Vicinity Map - Benton Lake National Wildlife Refuge Complex

Figure 1: Vicinity Map

Benton Lake NWR	Location
Benton Lake WMD	Boundary

I. INTRODUCTION

A. Purpose and Need

U.S. Fish and Wildlife Service policy requires that an approved Fire Management Plan must be in place for all of Service lands with burnable vegetation. Service Fire Management Plans must be consistent with firefighter and public safety, protection values, and land, natural, and cultural resource management plans, and must address public health issues. Fire Management Plans must also address all potential wildland fire occurrences and may include the full range of appropriate management responses. The responsible agency administrator must coordinate, review, and approve Fire Management Plans to ensure consistency with approved land management plans.

Service policy allows for a wildland fire management program that offers a full range of activities and functions necessary for planning, preparedness, emergency suppression operations, emergency rehabilitation, and prescribed fire operations, including non-activity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

B. Description of Refuge

1. Location

Benton Lake National Wildlife Refuge is located largely in Cascade County, Montana, with small portions of the Refuge in both Teton and Chouteau Counties. The refuge was established in 1929 and was first staffed in 1962. Refuge Headquarters is situated on the refuge fourteen miles north of Great Falls, the county seat of Cascade County and the second largest population center in Montana (Figure 1).

The Benton Lake Wetland Management District (WMD) was established in 1975 under provisions of the Small Wetland Acquisition Program and in 1998 included 21 Waterfowl Production Areas (WPA's) (Figure 1). The WMD encompasses 10 counties (25,000 sq.mi.) in north-central Montana. Three WPA's include co-mingled lands under Bureau of Land Management or State of Montana ownership. Management of these non-Service in-holdings is similar to that of adjacent Service lands.

Table 1: Management Units

Unit	Acres
Benton Lake National Wildlife Refuge	12,384
Benton Lake Wetland Management District (WMD)	14,506

2. Climate

Topography plays a large role in the area's climate. The Rocky Mountains to the west, and the Big Belt and Little Belt Ranges to the south, are primary factors in producing the frequent wintertime chinook winds observed in this part of Montana. As a result of recurring chinook winds throughout the winter season, complete snow cover seldom persists for a prolonged period of time. Wind velocity occasionally exceeds 50 miles per hour and winds in the 20 to 30 mph range are common. Annual precipitation ranges from 10 to 16 inches. The April-September period produces 70% of annual moisture. Mean relative humidity is about 50 percent between April and October and 60 percent the remainder of the year. The mean annual air temperature is 45 degrees F while recorded temperature extremes are a minimum of -50 degrees F and a maximum of 106 degrees F.

3. Topography

The Refuge lies on the western edge of the Great Plains approximately 50 miles from the eastern front of the Rocky Mountains. The typical terrain is best generally described as low, gently rolling hills. Most of the district is open rolling prairie but small isolated mountain ranges are found in the northern and eastern portions of the district.

4. Soils

The non-mountainous northern parts of the district and the Blackfoot Valley were heavily glaciated. Most soils are formed from glacial till and outwash sediments. Soil types found in the wetland basins and surrounding uplands are primarily McKenzie clay, Orman clay, Pierre clay and Winifred clay loam.

5. Hydrographic Features

Wetlands cover 5,563 acres on the refuge and 3,639 acres in the WMD. Wetland areas vary from bare mud flats and open water to short dense forb/grass to tall dense cattail/bulrush. The normal management water

surface in the refuge is at elevation 3626.0 M.S.L. and the highest hills in the vicinity are a little over 3900 feet.

6 . Wildlife

The lands administered by the Complex encompasses lands on both sides of the continental divide. Habitats range from forested mountains to short-grass prairie. This wide array of habitat types support a wide variety of animals (A listing of Resources is on file at Refuge Headquarters).

a. Invertebrates

No formal surveys have been conducted on any WPA's in the WMD. Obviously, a wide variety of terrestrial and aquatic invertebrates occur on Service lands. Eighteen invertebrate species are listed as species of special concern in Montana. None are known to occur on WPA's in the district.

b. Fish

There are 64 native and 28 introduced species of fish in Montana. Due to the scarcity of permanent water few fish species would be expected to occur.

c. Reptiles and Amphibians

Eighteen native reptile species and 19 native and two introduced amphibian species occur in Montana. No surveys have been conducted to determine occurrence. Four reptile and four amphibian species have a state classification of special concern.

d. Birds

Records exist for 391 native and nine introduced bird species in Montana. One hundred-ninety nine species have been observed in the Refuge since 1961 when records were first kept. Thirty-seven waterfowl species have been recorded in Montana. Most of these can be found in the Complex. Nesting records exist for sandhill cranes and numerous sightings of trumpeter swans have been made.

There are 34 bird species of special concern in Montana. Peregrine falcon and the bald eagle have been recorded. Peregrines occur during spring and fall migrations as do the bald eagle. One threatened species, the piping plover, may occasionally occur, although no specific records exist.

e.

Mammals

Mammal species are abundant and range from the pygmy shrew to the moose. Twenty-four mammal species of special concern are found in Montana. One Federal threatened species, the grizzly bear, has been recorded on the Jarina and Savik WPA's in Pondera and Teton Counties.

6.

Threatened and Endangered Species

There are no known resident endangered or threatened species plant or mammal species on the Refuge or WPA's. Grizzly bears occasionally visit some of the WPAs near the Rocky Mountains (See above).

The Refuge will implement its fire management program within the constraints of the Endangered Species Act of 1973, as amended, and Service policy which requires that State threatened and endangered species and Federal candidate species be incorporated into planning activities. The Refuge will take appropriate action to identify and protect from adverse effect any rare, threatened, or endangered species located within the Refuge.

7.

Cultural Resources

A formal inventory of the Refuge and WMD has not been completed, therefore, the extent of cultural resources is not known. There is one site listed on the National Register of Historic Places, an old wagon route that is difficult to distinguish on the ground.

8.

Land Use, Values, and Improvements

All of the land surrounding the Refuge and much of the land in the WMD is agricultural and is used primarily for dry land cereal grain farming. A smaller percentage is grazing land. An annual grazing program was established in the early years of the Refuge and continued until 1976 when

all grazing was discontinued. Grazing and haying are used as management tools on several WPAs and to a small degree on the refuge.

Most WPA's are surrounded by cultivated land or rangelands that are heavily grazed. To some extent this reduces the hazard of wildfire spreading from adjacent lands into Service lands. The primary threat for fires starting on WPAs is from public use and lightning. There are few government owned improvements on the WPAs other than fences which may be damaged by fire.

Economic loss from wildfire at the refuge could occur from loss of unharvested small grain on adjacent private lands if a fire escapes containment on the Refuge. The Refuge buildings are protected by mowed strips or wide gravel driveways. Some stockpiles of wood fence posts at the Refuge Headquarters may be vulnerable to fire at certain times of the year. A listing of improvements are on file at the Refuge Headquarters.

9. Socio-Political Climate

Local residents generally feel that grassland fires are destructive. They see fire as a threat to property as well as a detriment to "nature". Local fire departments are quick to extinguish grassland fires. However, farmers commonly use fire to burn grain stubble, road sides and field borders to aid farming without stirring public concern.

C. Habitat Types

The Refuge and most of the WMD are located in the short grass prairie of the Northern Great Plains. Uplands are primarily native grassland and are classed as a shortgrass disclimax. Western wheatgrass (*Agropyron smithii*), junegrass (*Koeleria cristata*) and green needle grass (*Stipa viridula*) dominate the native grassland community. Wetlands make up approximately half of the Refuge and a quarter of the WMD, and vary from bare mud flats and open water to short dense forb/grass to tall dense cattail/bulrush. Several other habitats and other fuel types occur on small acreages on several waterfowl production areas. Dense nesting cover (DNC), a mix of legumes and several species of tall growing bunch and rhizomatous grasses has been planted on both the refuge and many of the WPAs. This mix of species is excellent cover for upland nesting game birds such as ducks and pheasants.

Table 2: Habitat Types

Habitat	Benton Lake NWR	Benton Lake WMD
Native Prairie	5,773	7,384
Wetlands	5,563	3,691
Forest		220
Dense Nesting Cover	619	2,979
Other	427	232

D. Historical/Ecological Role of Fire

Fire was one of the natural forces maintaining northern grasslands. Lighting-set fires were common in the United States and Canada, however, fires set by native peoples were the type mentioned most often in historical journals, diaries and various other accounts. So often in fact, the subject of historical fire in the northern grassland plains is incontestable — it was there and native people used it for a variety of reasons (Gleason 1988).

Lightning is an integral part of climate and the frequency and return interval of lightning-set fires undoubtedly played an important role in the species composition and ecology of grasslands of the northern grassland plains (Gleason 1988).

Research within the past few decades has shown that fire has been an important natural component of many grassland communities. Fire has been used inconsistently to manage native and tame grasslands in the Northern Great Plains of the north-central U.S. and south-central Canada, particularly the grasslands found in prairies, plains, agricultural land retirement programs, and moist soil sites. This has happened for three primary reasons: (1) the reduction of American Indian use of fire after 1875, (2) fire suppression and land use changes that put increasingly more acres under annual tillage since about the same time, and (3) a growing resistance to the use of fire since about 1940 (Higgins, et al 1986).

Before European settlement, wildfire played a substantial role in the development of the prairie ecosystem. After settlement, however, over-grazing was prevalent for so long that it is doubtful that much of the prairie could sustain a widespread wildfire due to the scarcity of fuel. After the refuge was established and grazing was controlled, forage became somewhat more plentiful. Even in the best conditions, however, most of the prairie vegetation is sparse and slow growing.

Refuge Fire History

Fire in the Complex is influenced by the amount of vegetation the prairies are able to produce annually. Grasslands provide an upright fine fuel that is able to carry a fast moving, extremely hot fire line. Wind, often exceeding 20 miles per hour for hours or days at a time, enables prairie fires to spread rapidly when unencumbered by natural barriers or disturbed features. The flat to gently rolling terrain offers no natural firebreaks except for an occasional stream. Since European settlement, most of the grasslands have been broken and converted to cropland. In much of the district grasslands have become isolated tracts surrounded by a sea of cultivated land, reducing the chance for fire to spread across large areas.

In the mountain valleys, west of the continental divide, fires occasionally burn these areas, but not as frequently as the fires that burned in the Great Plains to the east. The mid-grass prairie zone to the east provided more fuel as a result of higher annual precipitation rates and fires were more frequent.

Large wildfires are fairly uncommon on the refuge. However, there is potential for large fire situations as exemplified by the fires of October 16, 1991. During a day of 50 to 70 mph winds, two fires of 950 and 4,000 acres occurred near Benton Lake Refuge. Refuge staff responded to both fires and assisted Teton and Chouteau County Fire District crews contain them. However, the containment of these fires can mainly be attributed to the fires running out of fuel when they encountered tilled cropland. Another range fire the same day in Hill and Blaine Counties burned 182,000 acres, caused several million dollars in damage, and killed one person. It is apparent that under the right conditions, large fires are likely to occur and may involve Service managed lands.

Fire records from the 1960's, 70's, and 80's are incomplete. A review of existing fire records indicate an average of about two wildfires per year occurred on the Refuge over the past 15 years and have ranged in size from 0.01 acres to 300 acres. Table 3 displays reported wildfire incidents occurring on the Refuge since 1962 while those on the WMD are listed in Table 4.

Table 3: Benton Lake NWR Wildfire History 1962-1998

YEAR	CAUSE	ACRES BURNED
1969	Lightning	1.5
1972	Weed burning	3.0
1991	Stubble burning by neighbor	300.0
	Lightning	0.2
	Lightning	<0.1
1994	Hot Brakes or other Automotive	0.1
	Lightning	1.0
1995	Smoking material discarded from passing vehicle	3.5
1995	Stubble burning by neighbor	0.5
1996	Smoking material discarded from passing vehicle	66.2
	Lightning	1.0
1997	Passing train	14.6
1998	Lightning	.05
	Electrical Transformer Short	2.5
	Lightning	44.0

In addition to the fires listed, since 1990 refuge fire crews have assisted County fire departments on an average of about once annually in the suppression of range fires on lands near the Refuge.

Table 4: Benton Lake WMD Wildfire History 1974-1998

YEAR	LOCATION	CAUSE	ACRES BURNED
1983	Not Indicated	Auto accident/car fire	2.0
1992	Brumwell	Passing train	68.0
1998	Brumwell	Welding - railroad workers	50.0

II. POLICY COMPLIANCE - GOALS AND OBJECTIVES

A. Compliance with Service Policy

Service fire management policy is based on the Departmental Manual (620 DM 1) and the Federal Wildland Fire Policy and Program Review. Wildfires will be suppressed using appropriate management response strategies. Management actions taken on wildland fires must consider firefighter and public safety, be cost effective, consider benefits and values to be protected, and be consistent with natural and cultural resource objectives. The Service will employ prescribed fire whenever it is an appropriate tool for managing Service resources and to protect against unwanted wildland fire. This plan provides fire management guidelines for the Complex.

B. NEPA Compliance

This plan meets the requirements established by the National Environmental Protection Act (NEPA). Regulations published in the Federal Register (62 FR 2375) January 16, 1997, categorically excludes prescribed fire when used for habitat improvement purposes and conducted in accordance with local and State ordinances and laws. Wildfire suppression actions are categorically excluded, as outlined in 516 DM2, Appendix 1. The Service has determined that prescribed fire activities will only be carried out in accordance with a Fire Management Plan that tiers off a land management plan that has addressed the use of fire as a management tool and has been through the NEPA process. An Environmental Assessment addressing the use of prescribed fire to achieve management objectives was completed in 1984 before implementing the Prescribed Fire Program on the Refuge. An Environmental Assessment addressing the use of fire to achieve management objectives was completed for the Wetland Management District in 1994. A copy of the Environmental Assessment for the Wetland Management District is attached. A copy of the Environmental Assessment and FONSI can be found in Attachment 1. This Fire Management Plan tiers off a land management plan that address the use of fire as a management tool and has been through the NEPA process, therefore an EA will not be completed for this plan.

C. Authorities Citation

Authority and guidance for implementing this plan are found in:

1. 42 Stat. 857; 16 U.S.C. 594, Protection Act of September 20, 1922. Authorizes the Secretary of the Interior to protect, from fire lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber

2. 47 Stat. 417; 31 U.S.C. 315, Economy Act of June 30, 1932. Authorized contracts for services with other Federal Agencies.
3. 69 Stat.66.67;42 U.S.C. 1856, 1856 a and b, Reciprocal Fire Protection Act of May 27, 1955. Authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency facilities in extinguishing fires when no agreement exists.
4. 16 U.S.C. 668 dd-668 ee, National Wildlife Refuge System Administrative Act of 1966, as amended.
5. 88Stat. 143; 42 U.S.C. 5121, Disaster Relief Act of May 22, 1974. Authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
6. 88 Stat. 1535; 15 U.S.C. 2201, Federal Fire Prevention and Control Act of October 29, 1974
7. Pub. L. 95-244, as amended by Pub. L. 97-258, September 13, 1982. 96 Stat. 1003 31 U.S.C. 6301-6308, Federal Grants and Cooperative Act of 1977.
8. 96 Stat.837, Supplemental Appropriation Act of September 10, 1982
9. Pub. L. 100-428, as amended by Pub. L. 101-11, April,1989, Wildfire Assistance Act of 1989
10. Department of Interior Departmental Manual, Part 620 DM, Wildland Fire Management (April 10, 1998)

D. Other Regulatory Guidelines

Fire Management activities within the Refuge will be implemented accordance with the following regulations and directions:

- # Departmental Manual Part 519 (519DM)
- # Code of Federal Regulations (36CFR 800)
- # The Archaeological Resources Protection Act of 1979
- # The Archaeology and Historical Preservation Act of 1974, as

amended

- # National Historic Preservation Act of 1966
- # The Endangered Species Act of 1973, as amended
- # The Provisions of the Clean Air Act, as amended 1990

E. Enabling Legislation and Purpose of Refuge (Mission Statement)

The Benton Lake National Wildlife Refuge Complex (Complex) consists of two separate but complimentary units of land managed by the U.S. Fish and Wildlife Service in north central Montana.

Benton Lake National Wildlife Refuge (Refuge) was established by Executive Order 5228 on November 21, 1929 "...as a refuge and breeding ground for birds....", and "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. ss 715d (Migratory Bird Conservation Act).

The Benton Lake Wetland Management District (WMD) was established in 1975 to manage Waterfowl Production Areas (WPAs) under provisions of the Migratory Bird Conservation Act, as amended. The Migratory Bird Conservation Act and the Consolidated Farm and Rural Development Act also apply.

F. Overview of Planning Documents

A Master Plan was prepared for the Refuge soon after the area was developed in the 1962. The Master Plan contains several operational resource plans which serve as "chapters." These resource plans are written to meet established goals and guide accomplishment of objectives. Several plans have been revised and amended thru the years. Taken as a whole, the refuge Master Plan is currently out of date, and in need of review and substantial revision. This Fire Management Plan relates most directly to the Grassland Management Plan, the Water (Wetland) Management Plan, the Public Use Management Plan and the Safety Plan chapters of the Master Plan. The existing management documents will be updated when the Comprehensive Conservation plan is finalized.

Each of the four plans addresses one or more of the objectives listed below. Guidance from this Fire Management Plan will ensure that response to wildfires and implementation of planned (prescribed) fires complements the efforts to achieve the goals of the Complex.

G. Habitat Management Goals and Objectives

Fire can have direct effects on habitat management goals. The purpose of this plan is to provide guidelines which will ensure that fire management activities provide for public safety and resource protection while providing maximum benefits to wildlife and habitat. Effective fire management will be beneficial to several Complex objectives (Appendix A).

To assure that the Refuge and WMD achieve their purposes through time, goals and objectives have been written which provide more detailed guidance to Complex staff in managing available resources. The focus of the goals are:

1. The **wildlife** species which use the Refuge and WPAs
2. The **habitats** which are present on these Service lands
3. The **people** (Public) who visit and benefit from the resources

For each of these goals, objectives and tasks have been identified to ensure their accomplishment.

1. Wildlife

Refuge Objective 1E: Upland Nesting Bird Production: To maximize productivity of upland nesting birds over the next five years (thru 2002)...

2. Habitat

Refuge Objective 2B: Wetland Restoration

Refuge Objective 2C: Upland Restoration. By April 1, 1999, the Refuge staff will initiate a five year upland habitat restoration project which will focus on arresting the invasion of crested wheatgrass into native grasslands...rolling back the frequency of crested wheatgrass to 10% or less on any 10 acre tract on the refuge.

Refuge Objective 2E: Native Grasslands. Maintain and manage 600 acres of native grasslands on a continuing basis for natural native plant diversity for the benefit of birds...

- # Refuge Objective 2F: Dense Nesting Cover. Maintain and manage 700 acres of...Dense Nesting Cover on a continuing basis...
- # Refuge Objective 2G: Pest Plant Control. Reduce noxious weed presence in refuge habitat by 2002 to the following levels; Canada thistle, 10 acres in scattered locations; hoary cress, absent; leafy spurge, absent; spotted knapweed, absent; musk thistle, 25 plants in three sites to comply with state law and to maintain the natural species diversity of the area.
- # WMD Objective 2A: Upland Habitat Management: ...(Use) haying, grazing, or burning as management tools to maintain healthy, vigorous upland vegetative communities.
- # WMD Objective 2C: Pest Plant Control: ...use (a variety of methods) to prevent new infestations and curtail or eliminate current infestations where possible.
- 3. Public
- # Refuge Objective 3C: Public Outreach: Conduct off-refuge activities ...for the education of the public about Service and Refuge Activities.

III. REFUGE FIRE MANAGEMENT OBJECTIVES

The goal of wildland fire management is to plan and make decisions that help accomplish the mission of the National Wildlife Refuge System. That mission is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. Fire management objectives (standards) are used in the planning process to guide management to determine what fire management responses and activities are necessary to achieve land management goals and objectives.

The primary goal is to provide for firefighter and public safety, property, and natural resource values. Service policy and the Wildland Fire Policy and Program Review direct an agency administrator to use the appropriate management response concept when selecting specific actions to implement protection and fire use objectives. The resulting Appropriate Management Response are specific actions taken in response to a wildland fire to implement protection and fire use objectives. With an approved Fire Management Plan, the Refuge staff may use wildland fire in accordance with local and State

ordinances and laws to achieve resource management objectives (habitat improvement).

Wildlife populations are seldom seriously effected adversely by one fire. However, repeated burning of an area whether by wildfires or planned burns, can have a negative effect on some wildlife species mainly through changes in the habitat. For that reason most management focus is on effects of fire on habitats. Wildfire control methods must not have adverse effects on habitat which exceed the effects of the fire itself. Fire management must be well integrated into the implementation of both upland and wetland management planning efforts.

A. Primary Objectives

There are three primary objectives for fire management at this Complex. They are in order of importance:

1. Protection of life and property on Service lands and on adjacent lands threatened by fire escaping from Service lands
2. Use of fire as a tool to achieve resource management objectives.
3. Implementation of a monitoring plan to ensure the collection and analysis of fire effects data needed for sound resource management decisions.

B. Secondary Objectives

Secondary objectives for the Complex fire management program include:

1. Protection from fire of important scientific, cultural, scenic resources, administrative and interpretive facilities, and recreation areas.
2. Restore and perpetuate native wildlife species by maintaining diverse plant communities.
3. Employ prescribed fire to enhance vegetation for wildlife benefits.
4. Maintain and enhance native prairie by retarding the invasion of exotic species.
5. Improve the vertical structure of vegetation to provide optimum nesting and brood cover for grassland nesting birds.

6. Maintain the vigor of perennial native grasses and forbs.
7. Provide an opportunity for public education and interpretation of how prescribed fire can be used to manage wildlife habitat.
8. To minimize human caused wildfires and to take appropriate action to recover resource losses when trespass violations occur.

IV. FIRE MANAGEMENT STRATEGIES

A. Implementation Strategies

Grasslands and marsh vegetation may be manipulated by various techniques or "tools". Haying, grazing, farming and prescribed burning may all be used in particular circumstances. On some management units fire may be the sole technique in managing the vegetation, but normally, it will be used in combination with other tools to best achieve refuge or wetland district objectives.

Service policy requires the Complex to utilize the Incident Command System (ICS) and firefighters meeting NWCG and Service qualification requirements for fires occurring on Service managed lands.

All wildfires will be suppressed as soon as possible using the Appropriated Management Response. Fires which originate on Service lands will, where possible, be confined to Service lands. In keeping with the appropriate management response concept, strategies employing a range of suppression options will be considered (Table 5). Minimum impact suppression tactics (MIST) will be used, where appropriate.

The primary response will emphasize the use of natural and manmade barriers such as lake margins, roads or field borders where these features are present. The primary method of attack will be with engines. Because of the light flashy nature of most fuels, fires tend to move rapidly if there is wind. Fires will generally be attacked starting at an anchor point then pursuing the head of the fire by following and extinguishing the flanks using water or foam. Backfires or burnout operations may be employed in situations where they would be effective such as increasing the effective width of a road or trail to stop an advancing fire.

Table 5: Appropriate Management Response

SITUATION	STRATEGY	TACTIC
1. Wildland fire on Refuge lands which does not threaten life, natural or cultural resources or property values.	Restrict the fire within defined boundaries established either prior to the fire or during the fire.	1. Holding at natural and man-made barriers. 2. Burning out. 3. Observe and patrol.
1. Wildland fire on Service property with low values to be protected. 2. Wildfire burning on to Service lands. 3. Escaped prescribed fire entering another unit to be burned.	Take suppression action, as needed, which can reasonably be expected to check the spread of the fire under prevailing conditions.	1. Direct and indirect line construction. 2. Use of natural and man-made barriers. 3. Burning out 4. Patrol and mop-up of fire perimeter.
1. Wildland fire that threaten life, property or sensitive resources. 2. Wildland fire on Service property with high values to be protected. 3. Observed and/or forecasted extreme fire behavior.	Aggressively suppress the fire using direct or indirect attack methods, holding the fire to the fewest acres burned as possible.	1. Direct and indirect line construction 2. Engine and water use. 3. Aerial retardant 4. Burn out and back fire. 5. Mop-up all or part of the fire area.

Hazard reduction prescribed burns will not be conducted in short-grass prairie areas due to the minimal occurrence of wildfire on Service lands in the Complex, the relative low amount of fuel build-up in most areas and the inherent risk of escape of planned burns. Economic value of the vegetative cover on most lands in the Complex is about \$10 per acre per year. The benefit achieved from prescribed burning as the method of hazard fuel reduction is not sufficient to overcome the actual or potential cost of this strategy. Other management tools will be used if fuels build up to hazardous levels. Prescribed fires will be used for hazard fuel reduction in situations where burning will be the most effective tool from both and economic and ecological standpoints.

B. Limits to Implementation Strategies

1. Plow, dozer or grader lines will not be used in upland areas except when that action would provide protection from loss of life or valuable property, and

must have Line Officer Approval. Recovery of these disturbed sites is very slow due to a variety of climatic, soil and plant response factors. The potential for invasion of disturbed sites by noxious weeds or exotic plants is high and can increase the management cost of rehabilitation. The use of these methods may be appropriate in managed wetlands which are dry and will be flooded after the burn. However, care must be exercised if heavy equipment is used to pursue fire into wetland areas that appear to be dry. Deep marsh sediments can be dry on the surface yet not be capable of holding up heavy wheeled or tracked vehicles.

2. Prescribed burning in areas where threatened, endangered, and candidate species exist will not be conducted if the prescribed fire is detrimental to the species or if any adverse impacts cannot be mitigated. Section 7 clearance will be secured, as appropriate.
3. The use of fire prescribed fire may be constrained due to the following: adverse weather, improper wind direction and speed, danger of damage to adjacent farmsteads or residences by smoke or escaped burns, adverse public reactions, practicality due to limited manpower and equipment, seasonal timing and safety. With an understanding of common local conditions, all of this constraints can be dealt with in the burn plan.
4. Often in periods of high fire danger, county or State-wide burning bans are imposed by public authorities. The Project Manager must be cognizant of those proclamations and all burning must be delayed if burn bans are in effect, even if a county burn permit has been received. The Regional and national levels of preparedness must also be tracked and known prior to any management ignition. At National Preparedness Level IV or V, all burns must have authorization of the Geographical Area Coordination Group. At Regional Preparedness Level V all prescribed burning will be canceled.
5. Generally, no more than one prescribed burn will be active at one time although multiple burns may be conducted consecutively in one day. Only in circumstances where additional burns are closely situated and can be safely managed by the Refuge staff and local back-up forces are available, will multiple fires be conducted simultaneously.
6. Retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.

C. Impacts of fire Management Activities

The impacts of prescribed fire on the local community will be minor. Temporary smoke impacts to residences downwind from prescribed fires may occur, although the nearest residence is more than two miles away and transport winds should begin to dissipate the smoke before it reaches the residences. Burning with a south or southwest wind will insure limited impact to a residence located just south of the refuge boundary on the east side of the Bootlegger Trail.

Refuge burns should not have any significant economic impacts to the local community. Planned burns target native grassland and marsh units. There is currently no economic use of these areas of the refuge. There is no refuge grazing program and haying is limited to seeded tame grasses and legumes which are not part of the current burning program.

Access to the refuge for visitors on burn days may be limited as a safety precaution. Burned areas along the auto tour route may reduce the amount of wildlife that visitors can observe. These are temporary impacts and the regrowth and cover quality improvement in the burned areas will attract more wildlife in the long run.

Fall marsh burns are very attractive to waterfowl after reflooding. The birds stay in these areas for extended periods of time which may reduce waterfowl use of areas open to hunting. It is also possible that these burned areas will attract more birds to the refuge which will provide additional hunting opportunities.

V. FIRE MANAGEMENT UNITS

A. Introduction

Benton Lake NWR and the 21 WPA's administered within this complex are scattered across a 10 county, 25,000 square mile area (Figure 1). Fire may be used from time to time on portions of these areas, however, it is impractical to discuss them all as individual treatment units in this plan.

Service lands covered by this plan are divided into two fire management units (FMU) (Table 6). FMU 1 includes all the lands of Benton Lake National Wildlife Refuge (Figure 2). FMU 2 includes all the lands of Benton Lake Wetland Management District (Figure 3).

Table 6: Fire Management Units / Acres

Fire Management Unit / Number	Acres
Unit 1 - Benton Lake National Wildlife Refuge	12,382
Unit 2 - Benton Lake Wetland Management District	14,506

Figure 2: Fire Management Unit 1

Figure 3: Fire Management Unit 2

B.

Fuels and Expected Fire Behavior

Because fuel and weather conditions are generally the same throughout the Complex, similar fire behavior can be expected on most units. The grassland and marshes produce ample fine fuels in most years. Low annual precipitation, warm summer temperatures and occasionally strong winds produce conditions conducive to rapid spread of fire. Chinooks, downslope dry warming southwest winds along the east side of the Rocky Mountains, commonly reach 40 miles per hour and at WPAs near the mountains occasionally exceed 75 mph. Fire spread is very rapid in such circumstances and pose a substantial danger to crews. Fires have been known to spread several miles in an hour under such conditions.

Wildland fuels of the Complex can be characterized as NFFL Fuel Models 1, 2 & 3.

Fuel Model 1 is the most abundant fuel found on the Complex and is largely represented as NFDRS Fuel Model L (perennials), with some classified as NFDRS Fuel Model A (annuals). Fire spread in this fuel type is governed by fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one third of the area.

Fuel Model 2 is characterized as NFDRS Fuel Model T. Fire spread in this fuel type is primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous materials, in addition to litter and dead-down stemwood from the open shrub or timber overstory, contribute to the fire intensity. Open shrub lands that cover one-third to two-thirds of the area. Such areas with shrub stands may include clumps that generate higher intensities and may produce firebrands.

Fuel Model 3 is also present on the complex. It is characterized as NFDRS Fuel Model N. This fuel model is primarily marshlands and some Dense Nesting Cover (DNC). Fires in this fuel model produce the most intensity of the grass group and display high rates of spread under the influence of wind. Wind may drive the fire into the upper heights of the grass and across standing water. Stands are tall, averaging about three feet. Cattails and rushes or cultivated grains that have not been harvested are included in this fuel model.

C. Fire Management Units

1. Fire Management Unit 1

a. Fuels

The physical features of the refuge have been previously described. A map of the Unit is depicted in Figure 2. Fuels present on the Unit are classified as NFFL Fuel Models 1, 2, and 3.

Table 7: Fuel Model - Unit 1

Fuel Model	Acres
Fuel Model 1	5,773
Fuel Model 2	60
Fuel Model 3	6,282

Fuel Model 1 occupies roughly 50% of the unit. Depending upon water and wetland conditions this area may increase by an additional 1,000 acres in some years when annual vegetation develops in dewatered marshes.

Fuel Model 2 is present on only about 60 acres and consists of shrub plantings and shelterbelts in scattered locations around the refuge. These consist of rows of planted Russian olive, caragana, green ash, and other species interspersed with open strips of grass.

Fuel Model 3 is found primarily in marshes and other wetlands. About 600 acres of upland DNC are included.

b.

Unit Fire Objectives:

1. Ensure the safety of Service staff and the visiting public.
2. Minimize the damage of fire and fire suppression efforts on refuge resources by using Minimum Impact Suppression Tactics
3. Prevent fires from escaping refuge boundaries onto adjacent private lands.
4. Utilize prescribed fire when it will be useful in achieving refuge wildlife and habitat objectives. Treat 500 acres annually

5. Respond to wildfires in a cost effective manner consistent with the values at risk.

c. Unit Strategies

All wildfire fires will be attacked aggressively. All fires on the Refuge have the potential to escape into adjacent private land and cause damage to crops, pasture or improvements. For that reason all fires must immediately be sized up by the responding Complex fire personnel and a decision made as to whether the responding Complex initial attack team can contain and control the fire. If there is any doubt, then assistance should immediately be requested from local fire departments or interagency resources.

d. Unit Tactics:

1. Roads, wetlands, and cropland field borders will be used where possible as primary control lines, anchor points, escape routes and safety zones.
2. Backfires will be used from roads or other barriers when it is safe and effective to do so.
3. Burnouts will be used to strengthen primary control lines when it is safe and effective to do so.
4. Fires will be attacked using engines. Hand line construction is to be avoided except in areas where engines and hoses cannot be deployed.
5. Approved fire retardant chemicals may be deployed by either air or ground forces when their use will be effective in containment, control or facility protection.

e. Limits to Strategy and Tactics

1. The use of dozer or plow lines will not be permitted on Service lands except to protect life or improvements such as buildings or bridges, and only with the approval of the Project Manager or his acting.

2. Fire Management Unit 2

a. Fuels

The physical features of the WMD have been previously described. Fuels present are classified as NFFL Fuel Models 1, 2, and 3.

Table 8: Fuel Models - Unit 2

Fuel Model	Acres
Fuel Model 1	7,384
Fuel Model 2	220
Fuel Model 3	6670

Fuel Model 1 occupies over 50% of the Unit. Depending upon water and wetland conditions this area may increase by an additional 1,000 acres in some years when annual vegetation develops in dry marshes.

Fuel Model 2 is present on approximately 220 acres on the Blackfoot and Kleinschmidt Lake WPAs and consists of sagebrush/grassland and a ponderosa pine/douglas-fir association.

Fuel Model 3 covers much of the remaining acres of the Unit and includes emergent marsh vegetation and about 2,979 acres of upland DNC.

The remaining fuels are located in scattered riparian areas and can be classified as Fuel Model 8 or Fuel Model 9 depending on the time of year and water levels.

b. Unit Fire Objectives

1. Ensure the safety of Service staff and the visiting public.
2. Minimize the damage of fire and fire suppression efforts on WMD resources.
3. Prevent fires from escaping WMD adjacent private lands.

4. Utilize prescribed fire when it will be useful in achieving WMD wildlife and habitat objectives. Treat 1,000 acres annually
 5. Respond to wildfires in a cost effective manner consistent with the values at risk.
- c. Unit Strategies

All wildfire fires will be attacked aggressively. Because of the small unit size and generally continuous fuels, all fires on the WPAs have the potential to escape into adjacent private land and cause damage to crops, pasture or improvements. Most of the WPAs are so distant from the Complex headquarters that timely response by refuge forces is not a reasonable expectation. This fact is recognized in mutual aid agreements developed with the various counties. When Service fire personnel are the first to arrive at a fire on a WPA, the fire must immediately be sized up by the responding incident commander and a decision made as to whether the responding Complex initial attack resources can contain and control the fire. If there is any doubt, then assistance should immediately be requested from local fire departments or interagency resources.

d. Unit Tactics

1. Roads, wetlands, and cropland field borders will be used where possible as primary control lines, anchor points, escape routes and safety zones.
2. Backfires and burnout operations will be used from roads or other barriers when it is safe and effective to do so.
3. Burnouts will be used to strengthen primary control lines when it is safe and effective to do so.
4. Direct attacked using engines will be the primary means of response. Hand line construction is to be avoided except in areas where engines and hoses cannot be deployed.
5. Approved fire retardant chemicals may be deployed by either air or ground forces when their use will be effective in containment, control or facility protection.

e. Limits to Strategy and Tactics

1. The use of dozer or plow lines will not be permitted on Service lands except to protect life or improvements such as buildings or bridges, and only with the approval of the Project Manager or his acting.

VI. FIRE SEASON

A. Refuge Fire Frequency

Fire records from the 1960's, 70's, and 80's are not complete. A review of existing fire records indicate an average of about two wildfires per year occurred on the Refuge over the past 15 years and have ranged in size from 300 acres down to 0.01 acre.

B. Fire Season

Fuel and weather conditions vary greatly year to year and, depending upon the conditions, fire can occur at anytime year around. The commonly used dates for the fire season used by the Bureau of Land Management and U.S. Forest Service in this area are from June 1 to September 30. Weather and vegetation conditions often produce high fire danger in the spring and fall months when vegetation is cured and high winds promote the rapid spread of fire in prairie grasslands. The spring period of highest fire danger extends from about March 15 through May 15. The fall high fire danger period begins about August 15 and ends about November 15. For fire planning purposes, the fire season on Service lands in the Complex begins March 15 and ends November 15.

VII. FIRE MANAGEMENT RESPONSIBILITIES

A. Refuge Staff Responsibilities

All fire management duties on the Complex are collateral duties. The Project Manager is responsible for planning and implementation of an effective and safest possible fire management program at the Complex. The Project Manager is also ultimately responsible for all fire management decisions related to both wildfire and prescribed fire in the Complex. The fire job responsibilities in the Fireline Handbook and the ones described for the positions below are to be fulfilled. A listing of staff and their qualifications can be found in Appendix B.

1. Refuge Manager

- ! Responsible for the overall management of the refuge including fire management.
- ! Insures fire management policies observed
- ! Fosters effective cooperative relations within the refuge, cooperating fire organizations, and adjoining land owners.
- ! Insures sufficient collateral duty firefighters meeting Service standards are available for initial attack.
- ! Supervises the collateral duty fire staff.
- ! Approves individual prescribed fire plans.
- ! Responsible for planning and coordinating preparedness activities including:
 - # The Refuge fire training program.
 - # Physical fitness testing and Interagency Fire Qualification System (IFQS) data entry.
 - # Coordinating with cooperative agencies on a regional level. Revising cooperative agreements as necessary.
 - # Insuring the Step-up Plan is followed.
- ! Prepares annual Firebase budget request and manages and tracks use of Firebase account.
- ! Responsible for coordinating prescribed fire activities including:
 - # Reviewing proposed annual prescribed fire program to meet resource management objectives.
 - # Completing daily validation that prescribed fires are under prescription and meet all other Service policy requirements.
- ! Maintains liaison with Regional Fire Management Coordinator and Cooperators.
- ! Maintains fire records, reviews completed DI-1202's for accuracy and submits them to the Zone FMO, and annually reviews and updates as necessary the Fire Management Plan.
- ! Serves as collateral duty firefighter, as qualified.

2. Assistant Project Manager

- ! Serves in the absence of the Project Manager
- ! Serves as collateral duty firefighter, as qualified

3. Maintenance Worker

- ! Maintains engine(s) in a state of readiness.
- ! Supervises and trains assigned engine crew, as qualified.
- ! Serves as collateral duty firefighter, as qualified.

4. Administrative Officer

- ! Serves as Dispatcher
- ! Completes all necessary administrative documents associated with fire management activities

5. Biological Technician

- ! Prepares units for prescribed burns
- ! Serves as collateral duty firefighter, as qualified

6. Seasonal and Collateral Duty Firefighters

- ! Responsible for their own fire records, equipment, and physical conditioning.
- ! Qualifies annually by completing the appropriate fitness test between January 15-30, or within 2 weeks of EOD date.
- ! Maintains assigned fire equipment in ready state and using all safety gear assigned.
- ! Assists the Project Manager maintain accurate fire records.
- ! Serves as collateral duty firefighter, as qualified

7. Wildfire Incident Commander (as assigned)

- ! The Incident Commander (IC) is responsible for the safe and efficient suppression of the assigned wildfire.
- ! Fulfills the duties described for the IC in the Fireline Handbook.
- ! Notifies the Project Manager or Dispatcher of all resource needs and situational updates, including the need for extended attack.
- ! Ensures wildfire behavior is monitored and required data is collected, and crews will be briefed on the strategy and tactics to be used, expected fire behavior, historic weather and fire behavior

patterns, impacts of drought, live fuel moisture, escape routes and safety zones, and radio frequencies to be used.

- ! Ensures personnel are qualified for the job they are performing.
- ! Identifies and protects endangered and threatened species and sensitive areas according to the Fire Management Plan.
- ! Utilizes minimum impact tactics to the fullest extent possible.
- ! Ensures fire is staffed or monitored until declared out.
- ! Ensures that the fire site is fully rehabilitated or that management is notified that rehabilitation is required.
- ! Submits completed DI-1202 (wildfire report), Crew time sheets, a listing of any other fire related expenditures or losses to the Project Manager, and completes taskbooks within 3 days of fire being declared out.

8. Prescribed Burn Boss (as assigned)

- ! Writes or reviews prescribed burn prescriptions for assigned blocks.
- ! Implements approved prescribed burn plans.
- ! Assist with the administration, monitoring, and evaluation of prescribed burns.
- ! Submits completed DI-1202 (wildfire report), Crew time sheets, a listing of any other fire related expenditures or losses to Administrative Officer, and completes taskbooks within 3 days of fire being declared out.

B. Cooperator Involvement and Standards

Along with other land management agencies, the Service has adopted the National Interagency Incident Management System (NIIMS) Wildland and Prescribed Fire Qualification Subsystem Guide, PMS 310-1 to identify minimum qualification standards for interagency wildland and prescribed fire operations. PMS 310-1 recognizes the ability of cooperating agencies at the local level to jointly define certification and qualification standards for wildland fire suppression. Under that authority, local wildland fire suppression forces will meet the standards established for their agency or department. All personnel participating in prescribed fire management activities must meet Service fitness and training standards.

Currently the Complex has Memoranda of Understanding with Chouteau County and Cascade County (Appendix C). Under these agreements, Rural Fire Departments will respond to fires on Service lands in their respective fire district and the Refuge will respond to fires in Chouteau and Cascade Counties which are on or threaten Service lands. When available, Complex staff and equipment will also respond upon the Cooperator's request for assistance on other wildland fires in

Chouteau and Cascade Counties that are within the capabilities of Refuge staff and equipment. Additional MOUs are being developed with other counties in the WMD where Service lands are located. Copies of those agreements will be appended to this plan when they are completed.

Malmstrom Air Force Base has agreed to provide equipment and manpower when requested and available to assist in fire suppression on the Refuge (Appendix C).

Because firefighters responding under mutual aid agreements are usually volunteers, they will have first priority for release. Frequently, individuals arrive at a fire to assist but are not members of a fire department or qualified for any type of fire suppression. These individuals will not be used as wildland firefighters on a Service lands.

Key interagency contacts are listed by name, function, location, alternate contact, and telephone numbers are listed on the Complex Fire Dispatch Plan (Appendix I).

VIII. EQUIPMENT AND STAFFING NEEDS

A. Normal Unit Strength

NUS is the amount of non-capitalized fire fighting equipment needed by a refuge to meet 70 percent of suppression needs. Tables indicating equipment and supplies needed to meet NUS requirements are found in Appendix D.

B. Personnel

1. Staffing Needs

The safety of firefighters and the public is the first priority. Persons engaged in fire suppression activities are exposed to a high element of risk. The Refuge Manager and fireline supervisors must make every effort to reduce the exposure to risk and enhance performance. One way is through formal and on-the-job training and improved physical fitness. The Service has adopted the training and fitness standards established in 310-1, and all firefighters must meet these and other standards established by the Service to participate in fire management activities, however a fitness waiver has been granted for fire management activities occurring at the Refuge.

Personnel and level of qualifications requirements for both suppression and prescribed fire operations are found in Table 9.

Table 9: Personnel Qualifications Needs

POSITION / QUALIFICATION	Needed	
	Wildfire	Prescribed Fire
Incident Commander Type 4/5 (ICT4 or ICT5)	1	
Single Resource Engine Boss (ENGB)	2	2
Engine Operator (ENOP)	2	2
Firefighters (FFT1 or FFT2)	3	3
Burn Boss Type 3 (RXB3)		1

A firefighter can be qualified for more than one position.

2. Fitness Requirements

The Complex requested and received from the Regional Fire Management Coordinator an exception to Arduous Duty fitness requirements for fire control (Appendix E). Therefore, none of the Complex firefighters will be required to meet Arduous fitness requirements when involved in fire management activities on Complex lands. By this exemption, Service firefighters dispatched to fires occurring on Complex or threatening Service lands must, at a minimum, meet the Moderate Fitness standard. Other station employees who have not been tested or do not meet or exceed the fitness standard for the position they are filling, may assist in support capacities but will not be permitted to work on the fire line.

Complex firefighters dispatched to fires occurring off-Complex **must** meet the Arduous Fitness standards.

IX. PREPAREDNESS

A. Staffing

During the fire season, the Complex will attempt to maintain roster listing a minimum of six (6) collateral duty firefighters who will be available for dispatch to fires on the Complex or threatening Service lands or assist with other fire management activities. It is recognized this goal may be constrained by budget and staff ceilings. Only trained and qualified employees will be assigned to fire management duties. All fire management personnel will be issued appropriate personal protective equipment and will be trained in its proper use. Current members of the Complex fire management team and their qualifications are listed in Appendix F. A listing of all employees of the Complex and contact telephone numbers can be found in Appendix I.

B. Pre-season Readiness Activities

Table 10: Annual Refuge Fire Management Activities

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12
Update Interagency Fire Agreements/AOP's	x											
Winterize Fire Management Equipment										x		
Inventory Fire Engine and Cache		x										
Complete Training Analysis	x											

Annual Refresher Training			x										
Annual Fitness Testing			x										
Pre-Season Engine Preparation			x										
Weigh Engines to verify GVW Compliance			x										
Prescribed Fire Plan Preparation			x										
Review and Update Fire Management Plan				x									

Activities should be completed prior to the end of the month that is indicated.

Engine Maintenance

All refuge fire equipment will receive a maintenance safety inspection prior to the start of each fire season. Refuge engines will be equipped with appropriate tools, firing devices, and water handling accessories for initial attack. All firefighters will be trained in their use.

Annual Refresher Training

All personnel involved in Fire Management activities are required to participate wildland fire management refresher training annually in order to be qualified for fire management activities in that calendar year. Refresher training will concentrate on local conditions and factors, the Standard Fire Orders, LCES, 18 Situations, and Common Dominators. NWCG courses Standards for Survival, Lessons Learned, Look Up, Look Down, Look Around, and others meet the firefighter safety requirement; but, efforts will be made to vary the training and use all or portions of other NWCG courses to cover the required topics. Fire **shelter use and deployment** under adverse conditions, if possible, **must** be included as part of the annual refresher.

Physical Fitness

All personnel involved in fire management activities will meet the fitness standards established by the Service and Region. At this point in time, firefighters participating in wildfire suppression at the Refuge must achieve and maintain an **Moderate** rating. Firefighters participating in Prescribed Burns must achieve and maintain a **Moderate** rating. Specific instructions to administer the tests, a health screening questionnaire to aid in assessing personal health and fitness of employees prior to taking the test, an informed consent form, and safety considerations can be found in Appendix G. A trained and qualified American Red Cross First Responder (or equivalent) who can recognize symptoms of physical distress and appropriate first aid procedures must be on site during the test.

Wildland fire fitness tests shall not be administered to anyone who has obvious physical conditions or known heart problems that would place them at risk. All individuals are required to complete a pre-test physical activity readiness questionnaire prior to taking a physical fitness test. They must read and sign the Par-Q health screening questionnaire, an informed consent form (Appendix G). If an employee cannot answer NO to all the questions in the PAR-Q health screening questionnaire, or is over 40 years of age, unaccustomed to vigorous exercise, and testing to achieve a Moderate or Light rating, the test administrator will recommend a physical examination. As noted below, all individuals over 40 years of age **must** receive an annual physical **prior** to physical testing.

Physical Examinations

In keeping with Service Policy, a physical examination is required for all new permanent employees and all seasonal employees assigned to arduous duty as fire fighters prior to reporting for duty. A physical examination may be requested for a permanent employee by the supervisor if there is a question about the ability of an employee to safely complete one of the work capacity tests. All permanent employees over 40 years of age who take the Pack or Field Work Capacity Test to qualify for a wildland or prescribed fire position are required to have an annual physical examination before taking the test. The Cost of the examination will be born by the Service and the results sent to the Region Personnel Department.

C. Impacts of Drought and Regional and National Preparedness Levels

Periods of drought can greatly impact fire behavior and resistance to suppression. For that reason the Rangeland Fire Danger Index, Palmer Drought Index, and the Keetch-Byram Drought Index will be monitored at a minimum on a weekly bases throughout the year. All are available on the Internet at <http://ndc.fws.gov> or <http://www.boi.noaa.gov/fwweb/fwoutlook.htm>. or contact the Great Falls Dispatch Center (406-761-3441) during periods of high fire danger to track indices and anticipate possible fire activity.

As a general guide, a severe drought is indicated by a Palmer Drought Index reading of -4.0 or lower or a Keetch-Byram Drought Index of 600 or greater.

Large scale fire suppression activities occurring in various parts of the country can have an impact on local fire management activities. For example, resources may be limited to implement prescribed fire activities because the closest available resources may be assigned to fire suppression duties or Refuge personnel may be involved as well. Regional drought conditions may also tie-up local resources that would normally be able to assist with Refuge fire management activities. It may be necessary to go out of Region to get the resources needed to staff the Refuge engine during periods of extreme drought or high fire danger.

Preparedness actions have been identified in the Step-Up Plan to respond to unusual conditions associated with drought and other factors (See following section).

D. Step-Up plan

Until such time as the Complex gets a weather station and inputs data into WIMS, a Step-up Plan will not be developed (Appendix H). The Complex staff will contact the Coordination Center at Great Falls (406-791-7707) during periods of high fire danger to track indices and anticipate possible fire activity.

E. Severity and Emergency Presuppression Funding

Severity funding is different from Emergency Presuppression funding. Emergency Presuppression funds are used to fund activities during short-term weather events and increased human activity that increase the fire danger beyond what is normal. Severity funding is requested to prepare for abnormally extreme fire potential caused by unusual climate or weather events such as extended drought or strong windstorms. Severity funds and emergency presuppression funds may be used to rent or preposition additional initial attack equipment, augment existing fire suppression personnel, and meet other requirement of the Step-up Plan.

Emergency Presuppression and Severity funds will be requested in accordance with the guidance provided in the Service's Fire Management Planning Handbook. As a general guide, Severity funding will be requested if a severe drought is indicated by a Palmer Drought Index reading of -4.0 or less or a Keetch-Byram Drought Index of 600 or greater **and** a long-range forecasts calling for below average precipitation and/or above average temperatures. Drought Indices can be located at: <http://www.boi.noaa.gov/fwweb/fwoutlook.htm>

X. WILDFIRE PROGRAM

A. Special Safety Concerns and Firefighter Safety

Safety of Service employees and cooperators involved in fire management activities is of primary concern. Only trained and qualified employees will be assigned to fire management duties. All fire management personnel will be issued appropriate personal protective equipment and will be trained in its proper use. No Service employee, contractor or cooperator will be purposely exposed to life threatening conditions or situations except when necessary to save the life of another person.

The primary threat to firefighter safety is from fast moving, wind-driven wildfires that can quickly over take and trap firefighters. Due to terrain, soil conditions, and the location of various wetlands and water courses, it may be difficult for an engine to out-run a fast moving fire. It is important that firefighter practice LCES **at all times!** Spot weather forecasts should be requested early-on during initial attack to gain insight into the possibility of shifting winds from thunderstorms approaching fronts, and other weather related phenomena.

Smoke from wildfires and prescribed fires are recognized health concerns for firefighters. Prescribed burn bosses and wildfire incident commanders must plan to minimize exposure to heavy smoke to 1 hour or less, at which time the firefighter should be rotated to a smoke free area (USDA Forest Service, Missoula Technology and Development Center).

B. Prevention Program

Fire occurrence on Service lands in the Complex does not warrant a separate fire prevention plan. Most fires which have occurred in the past 10 years have been attributed to lightning and human activity. There is little that can be done to prevent lightning caused fires and that category will not be addressed here.

Human caused fires have resulted from a variety of activities including escaped agricultural burning, discarded smoking materials, equipment malfunctions and possibly arson. Because of the relatively low number of visitors annually to the Complex, the low volume of non-visitor traffic on adjacent roads, and the low

level of human activity adjacent to Service lands, the annual fire risk is low. Reviewing past fire activity, the probability of one human caused wildfire on lands in the Complex is about 50% each year while the probability of staff responding to one or more wildfires on or adjacent to the refuge is about 80% each year. Most refuge fires occur along Bootlegger Trail, a paved highway with comparatively low volumes of motor traffic which bisects the extreme eastern end of the Refuge.

The primary fire prevention actions will be as follows:

- # Off-road travel by motor vehicles is prohibited at all times on all Service lands.
- # Open fires by hunters or other refuge visitors are prohibited year-around.
- # During periods of high fire danger, signs will be erected along major routes of travel warning of fire hazards and presenting a fire prevention message.
- # Prior to the beginning of hunting season, parking areas commonly used by hunters will be mowed to reduce the height of vegetation to reduce the likelihood of vehicle caused fires.

C. Detection

Due to the open flat terrain, smoke from a fire on the refuge is easily detected on all parts of the Refuge generally within a short time after ignition. Refuge personnel as well as neighbors are able to easily observe fires while involved in their daily duties. Fires at night are usually spotted and reported by refuge neighbors or travelers on Bootlegger Trail. It would be a rare situation for Complex employees to be the first to detect a wildfire on a WPA. Fires in the WMD are usually reported by adjacent landowners or neighbors to their nearest rural fire department which in turn notifies the Refuge. If lightning is known to have occurred, all refuge personnel will be advised and patrols may be assigned by the Project Manager.

There may be occasions when unqualified personnel discover a wildland fire. When this occurs the employee should report the fire and request assistance before taking action to suppress or slow the spread of the fire. If the fire poses an imminent threat to human life, the employee may take appropriate action to protect that life before requesting assistance. The unqualified personnel will be relieved from direct on-line suppression duty or reassigned to non-fireline duty when qualified initial attack forces arrive.

D. Fire Reporting and Dispatching

All fires occurring within or adjacent to Service lands within the Complex will be immediately reported to the Headquarters or Refuge Manager. Dispatching duties will be directed by the Refuge Manager. Requests for assistance from cooperators on fires not threatening Service lands must be made to and approved by the Refuge Manager. Only qualified and properly equipped resources will be dispatched for any fire assignment. The Dispatch Plan is outlined in Appendix I.

The following actions will be taken in the event of an dispatch:

1. The Dispatch plan will be implemented.
2. The closest member of the fire suppression team should be notified by radio or in person. Next, the manager, assistant manager, maintenance workers, and other members of the suppression team should be notified. The Refuge Assistant or Dispatcher will maintain a log of radio communications (Appendix I).
3. The first firefighter notified will ready the engine and with at least one other firefighter proceed to the fire. Other fire suppression team members will meet at the fire and/or Headquarters to bring additional equipment, if necessary and available.
4. The highest qualified firefighter on the scene of the fire will assume the duties of the IC until released by the Manager or Assistant Manager or replaced by a qualified IC.
5. In the event additional resources are needed, the IC will make the decision when to call the Fire Department and inform the Refuge Manager or Dispatcher. All employees assigned to the fire will remain on duty until released by the IC.

Often, fires are reported by the public directly to local fire departments. Rural fire departments are very quick to respond and, especially at night, may arrive at the fire before Complex staff and equipment. On the WMD, notification of refuge staff may not occur until the fire has been extinguished naturally or by local resources. In fact, most of the WPAs are so distant from the Complex headquarters that timely response by refuge resources is not a reasonable expectation. This fact is recognized in mutual aid agreements developed with the various counties.

When a Complex crew arrives at a fire after a local fire department has already initiated suppression actions, the leader of the crew must make contact by radio or

in person with the local fire chief to coordinate their work on the fire and transition command of the fire.

E. Escaped Fires/Extended Attack

Although it is very unusual, If a wildfire on Service lands to extend into a second burning period, the designated Incident Commander must contact the Refuge Manager so that the daily application of decision criteria regarding a wildfire may be completed.

The IC will notify the Project Manager if it appears:

- # A fire will escape initial attack efforts
- # The fire will escape Service lands
- # The fire complexity will exceed the capabilities of the IC and/or committed resources
- # The fire extends into a second burning period.

The Refuge Manager in consultation with the local fire chief will decide whether to request assistance from other cooperators or interagency resources. These requests will be coordinated through the Zone FMO located at Missoula, Montana. The Zone FMO will be responsible for coordination all extended attack actions including:

- # Assignment or ordering of appropriate suppression resources.
- # Complete the Wildland Fire Situation Analysis (Appendix J)
- # Completion of Delegation of Authority for Project Manager signature if needed (Appendix J).

F. Fire Suppression

Most small wildfires in the WMD are extinguished by local fire departments before the refuge staff are even aware of them. Rural fire departments normally respond to reported wildfires without contacting the Refuge before beginning suppression action. Should a local fire department arrive prior to Service personnel, they will follow their department procedures and protocol for fire control. When a qualified Service IC arrives at an incident, a transition will be

made, transferring command of the incident to the Service employee.

All wildfires on Service lands must receive active initial response as soon as refuge staff become aware of the fire. Initial attack by Complex employees, usually be field station personnel, will be with the station's engine units. The most qualified individuals available will be in charge of initial suppression efforts until an Incident Commander arrives. If fire line qualified employees are not immediately available, then the nearest county fire department should immediately be requested to respond to the fire under the Memorandum of Understanding which is in effect with that county.

The Refuge Manager will serve as Incident Commander (IC), as qualified, or will appoint a qualified IC for each fire. If a qualified IC is not available, the most qualified Complex employee to reach a wildfire will act as the IC until a qualified Service IC arrives. All resources will report to the IC in person or by radio prior to deploying on the fire. The IC will be responsible for managing all aspects of the fire. The IC will size-up the fire, determine the resource needs for the fire and relay that information and instructions to the dispatcher as soon as possible. The IC will be responsible for placing or canceling resource orders for the fire, as well as briefing firefighters on expected weather, fire behavior, communications, escape routes, and safety zones. Fire lookouts will be posted.

G. Mop up Standards and Emergency Stabilization and Rehabilitation

The IC will be responsible for mop-up and mitigation of suppression actions taken on Refuge fires. The mop-up standards established in the Fireline Handbook will be followed. Refuge fires will be patrolled or monitored until declared out.

Prior to releasing all firefighters from a wildland fire the following actions will be taken:

- G All trash will be removed.
- G Firelines will be refilled and waterbars added if needed.
- G Hazardous trees and snags cut and the stumps cut flush.
- G Disked firelines should be compacted as soon as possible to preserve the living root stock of natives grasses.
- G Overturned sod resulting from plowing must be rolled back with a grader or by hand and compacted to preserve native grass root stock.

Other emergency stabilization and emergency rehabilitation measures may be taken in accordance with Chapter 5 of the Fire Management Handbook (December 28, 2000).

Briefly:

- G **Emergency stabilization** is the use of appropriate emergency stabilization techniques in order to protect public safety and stabilize and prevent further degradation of cultural and natural resources in the perimeter of the burned area and downstream impact areas from erosion and invasion of undesirable species. The Incident Commander may initiate Emergency Stabilization actions before the fire is demobilized, as delegated by the Agency Administrator, but emergency stabilization activities may be completed after the fire is declared out.
- G **Rehabilitation** is the use of appropriate rehabilitation techniques to improve natural resources as stipulated in approved refuge management plans and the repair or replacement of minor facilities damaged by the fire. Total "rehabilitation" of a burned area is not within the scope of the Emergency Rehabilitation funding. Emergency Rehabilitation funding can be used to begin the rehabilitation process if other funding is committed to continue the rehabilitation throughout the life of the project (beyond the initial 3 years of Emergency Rehabilitation funding). Major facilities are repaired or replaced through supplemental appropriations of other funding.
- G Because of the emergency nature of the fire event, the emergency stabilization section of the Emergency Stabilization and Rehabilitation Plan (ESR Plan) must be developed expeditiously and is frequently developed by a local unit or designated burned area ESR team. The rehabilitation section of the ESR Plan is not considered an emergency, and is developed as other refuge land use plans. In order to be funded, ESR Plans must meet resource management objectives and be approved by the Project Leader and the Regional Director.

XI. PRESCRIBED FIRE PROGRAM

A. Program Overview

Prescribed fire has been infrequently used at the Complex. Most activity has occurred in the past 10 years. Planned burns have been conducted on an average of once every two or three years during this period. Burning has been used almost exclusively as a tool to improve wildlife habitat conditions or vegetative composition. Proper management of upland plant communities can provide optimum plant vigor, growth and density. Without manipulation by fire or another disturbance factor, the grasslands may become stagnant and decadent exhibiting reduced vegetative productivity. This often results in increases in invasive weeds or other undesirable changes in the plant community. Fire will be used when it will be beneficial in maintaining plant community health.

Fire will be used in combination with other means (mowing, grazing, haying and mechanical treatment) in the control of emergent vegetation and managing grasslands. All or combinations of the above tools will be applied to each specific management unit based on vegetation surveys and subsequent evaluation of treatment needs. In some sites fire may be used infrequently with haying and/or farming. In other sites, fire may be used almost exclusively to meet the objectives. When the soils of marsh basins are wet, for example, only burning can be used effectively for manipulation of vegetation. Burning may also have value in controlling invading exotic and introduced (naturalized) plants. The various techniques were discussed in the Prescribed Fire Environmental Assessment (1984) and the Environmental Assessment for Habitat Management Practices (1994). Refer to these documents for the advantages and disadvantages of each technique.

Shallow wetlands which are not actively managed tend to become overgrown with tall emergent vegetation which reduces their value to many wildlife species targeted for management. Fire will be used in marsh units to remove upland vegetation from pool basins and for burning openings in emergent vegetation. A more optimum interspersed of open water and stands of emergent vegetation can be provided by burning and manipulation of water levels.

Prescribed fire will be used to:

- # Manipulate marsh vegetation to achieve a more desirable ratio of open water to vegetation. Waterfowl maintenance will be maximized under those conditions.
- # To achieve the most desirable plant composition, plant vigor and height/density of upland stands. Waterfowl and upland bird

benefits will be maximized when those conditions are met.

- # On the Refuge fire will be used to manipulate vegetation in the following plant communities: 1) foxtail barley and Garrison creeping foxtail in dry pool basins; 2) cattails and other emergents in refuge wetlands; 3) seeded legume/grass mixes in DNC plantings; and, 4) native prairie being invaded by exotic or naturalized species or when declining plant diversity is detected.

Some of the Refuge DNC units which were established in the mid-1970s remained productive for over fifteen years before a rejuvenation program was initiated in 1990. About 700 acres of DNC in seven units are present on the Refuge. A like amount is managed on WPAs. Prescribed burning is most beneficial when used to manipulate DNC units and to remove excess vegetation from marsh pool bottoms prior to inundation. These DNC units may be manipulated with fire or other management tools in these circumstances:

- # When habitat monitoring indicates a decline is occurring in vegetative health

- # When nesting productivity declines due to reduced habitat quality.

In the short grass prairie ecosystem found at the Complex, annual vegetative productivity is often low but accumulation of dead vegetation and litter to pre-burn levels can occur within two or three years. As a result, fuel hazard reduction burning of native grassland does little to reduce fire danger in subsequent years.

Impact from implementation of this prescribed fire plan either on or off site will be minimal. The infrequency of burns, their short duration and generally small size will have negligible environmental, social, or economic effects. Most burns will be conducted during periods of low refuge visitation. Burns may occasionally inconvenience refuge visitors when the refuge tour route or other refuge facilities may be temporarily closed. Public roadway users may be inconvenienced by delays if smoke drift results in temporary closure of adjacent public roads. Proper burn planning and prescriptions can reduce those instances to a minimal number. All potential burning units are sufficiently distant from population centers that there is no likely impact from burning under this plan on local communities.

B. Fire Management Objectives

Fire will be used as a habitat management technique to manipulate grassland and marsh vegetation for these purposes:

1. Maximizing waterfowl maintenance during spring and fall

migrations

2. Maximizing production of waterfowl and upland nesting birds
3. Establishing, maintaining and improving the grassland and wetland plant communities. Treat 500 acres annually.

It is reasonable to expect accomplishment of one to three burns annually totaling up to 500 acres with current refuge staff and resources. With additional assistance from other Service fire program resources, this level of activity could be increased substantially.

C. Limits

Before prescribed burns are conducted in Cascade County, it is necessary to secure a special burning permit from the Cascade County Sheriff or the City-County Health Department in Great Falls. Failure to secure a permit prior to burning is a misdemeanor under the Montana Department of Health regulations and Public Health Codes of Montana. A sample permit is shown in Appendix K. Other counties have different rules and ordinances regarding open burning. During the preparation of the station annual burning plan, contacts must be made with County Fire Wardens to notify them of the plans and to determine if any special permits are required.

On the WMD, fire will be used where it can be safely employed when compared to other management techniques. There are numerous places where the size of the area and the distance from Complex headquarters will make it uneconomical to use fire as a management tool. On other WPAs there are safety and containment problems which will make burning difficult. All these issues will not be described here. Areas which are problematic for burning will be identified as part of the annual management planning process. It may be necessary to identify other management tools to manage those areas.

D. Burn Season

The normal prescribed fire burning season is bimodal with the first period beginning in late winter/early spring after snow melt is completed and ending in late May when vegetative green-up has advanced substantially. The second period begins in August after plant maturity has occurred and extends into early winter when average temperatures have fallen and snow has increased soil, duff and fuel moisture levels.

E. Complexity

The prescribed fire program on the Complex is not particularly complicated. Single fuel types typically predominate across large portions of the refuge and individual WPAs. Large portions of tracts are often wet or are covered with open water. Most burns will be conducted in single fuel types, with roads, water or fallow crop fields providing a physical barrier to buttress the fire line. All burns will be completed in one burning period. Table 11 lists Service lands that may be subject to prescribed fire, the activity/ complexity level of each and the airshed in which they reside. Complexity for each burn will be determined using the Region 6 Complexity Analysis guide (Appendix L).

Table 11: Service Lands Subject to Prescribed Fire

Tract Name	County	Airshed	Prescribed Fire Activity/Complexity
<u>Refuges</u>			
Benton Lake NWR	Cascade, Teton Chouteau	9	moderate/low
<u>WPAs</u>			
Hartelius	Cascade	9	low/low
Schrammeck Lake	Cascade	9	low/moderate
Big Sag	Chouteau	9	low/low
Kingsbury Lake	Chouteau	9	low/moderate
Peterson	Glacier	9	low/low
Sands	Hill	9	low/high
Jarina	Pondera	9	low/moderate
Blackfoot	Powell	6	low/high
Kleinschmidt Lake	Powell	6	low/moderate
Brumwell	Teton	9	low/high
Arod Lakes	Teton	9	low/low
Savik	Teton	9	low/moderate
Blackhurst	Toole	9	low/low
Brown	Toole	9	low/low
Cemetery	Toole	9	low/low
Danbrook	Toole	9	low/low
Dunk	Toole	9	low/low
Ehli	Toole	9	low/low
Furnell	Toole	9	low/moderate
Long Lake	Toole	9	low/low

F. Planning

Throughout the year Complex staff will be monitoring habitat and wildlife populations on Service lands. When it becomes apparent to the staff that fire would be an appropriate tool to employ in a certain situation, that information will be noted and discussed with other staff to review the particulars of the situation. After review of the proposal the Project Manager will decide whether to proceed

with a planning effort. Guidance provided in the Fire Management Handbook (621 FWM 3) will be adhered to in all prescribed burning activities on the Complex.

Service lands are dispersed over a 10 county area and include hundreds of specific management units involving several plant communities. Specific prescriptions cannot be developed for each area within the scope of this plan. Instead, an Annual Burning Plan will be prepared according to the Region 6 format and will contain more specific information on areas proposed for burning. Fire prescriptions will be prepared for every planned habitat burn in accordance with established Service and Regional procedures.

Contingency Planning:

Benton Lake NWR is almost entirely surrounded by cropland. There are two small areas of heavily grazed grassland on the northwest and southeast sections of the refuge. A small CRP field with a cultivated firebreak is adjacent to the southwest section of the refuge. The potential for escape of any refuge prescribed ignition onto private land is very low. Fallow ground and stubble that has been cultivated, which is the predominant management practice around the refuge, does not carry a fire well. The potential for escape of a wildfire that starts on the refuge and moves onto private land is higher, especially if it occurs when the small grain crops have cured, but have not been combined. A fire that spreads into this type of fuel has a higher chance of carrying across private land.

Prescribed ignitions or wildfires on private land adjacent to the refuge have a higher probability of spreading onto the refuge. Prior to greenup in the spring when refuge grasslands and marshlands have dry cured fuels, a fire that reaches the refuge from private land will spread rapidly. After greenup the potential for spread onto the refuge is reduced. Smoke produced by wildland or prescribed fire operations may have a short-term impact on Refuge neighbors or roads in the area. Most often, these impacts can be easily mitigated. Prescribed burn plans will address all issues affecting the public. In addition to mitigation measure, a section describing contingency action items will be included in each prescribed burn plan. This section will address:

- G What constitutes an escape (Trigger Points)
- G Who declares the escape a wildfire
- G Who notifies whom
- G Who assumes the duties of the Incident Commander and what are the roles of others
- G What actions are to be taken.
- G Where are the secondary lines and what are the boundaries and

limits.

Benton Lake has mutual aid agreements with Cascade and Chouteau counties. These are the counties where refuge lands are located. Although we do not have a specific mutual aid agreement with Malmstrom AFB or the Montana Air National Guard, these departments typically respond as well. Responses to wildfires on Benton Lake NWR are typically rapid with numerous departments deployed on site.

Through out the year, the Project Manager and Zone Fire Management Officer will conduct reviews of the Complex's fire management activities. As part of the process, all prescribed fires will be reviewed to insure that habitat management objectives were achieved. Written notes attached to the burn plan and the notes will be used to plan the next year's fire management activities.

G. Preparation and Implementation

Planning and preparation for prescribed burning must go through an organized process to ensure all required activities are accomplished. When conducted in the proper sequence, burning operations will be much more efficient and safe. Following is a list of the steps to be followed.

1. Preplanning

In November of each year during the annual fire program review, prescribed burning needs should be discussed and assignments made for preparation of prescriptions and burning plans for specific burns for the upcoming year.

2. Plans and Prescriptions

At the earliest possible time, but no less than 60 days prior to the expected burn date, the prescribed fire plan for each burn should be completed and presented to the Project Manager. The plans are then sent to the Zone Fire Management Officer for review. When the plans are returned after the FMO review, the Project Manager will make changes to the plan as necessary based upon FMO comments, then approve the burning plan.

3. Site Preparation

Preparation of fire breaks or other site work may begin at any time after a decision has been made to conduct a burn in a specific area.

There may be activities that are more easily accomplished in winter when the ground is frozen or when other related refuge operational activities make it convenient to do the work. The Project Manager will assign qualified individuals to conduct the work.

4. Staff Schedules

Staff who are to work on the burn should be notified of the burn schedule at least a four weeks prior to the burn to ensure that they plan their work and leave accordingly.

5. Burn permits

A county burning permit should be requested from the County Sheriff's office at least two weeks prior to the planned burn date.

6. Equipment Preparedness

The week prior to the burn, all engines, tools, supplies and other items should be checked to assure that things are ready and in working order. On the day prior to the burn date, the Burn Boss should inspect tools and equipment to be used so that unexpected shortages do not show up on the burn day and delay or prevent the planned burning activity.

H. Monitoring and Evaluation

Marsh burns are documented by ground and aerial photographs. Photo-points and aerial photos are currently on file which date back to 1962 for the marsh units and photo-points of all grassland management techniques are documented. Normally, photo-points are taken prior to seeding of DNC units and are updated as the stands mature. New photo-points are added as needed.

Waterfowl surveys are taken annually for comparison of use before and after treatments. The refuge has on file duck nesting studies which contain Robel readings for each unit studied. Nesting surveys are done on an annual basis and vegetative surveys are documented at the same time. Notes are taken on habitat conditions, wildlife, and proposed management for the next year.

The Region 6 Monitoring Guidelines will be used during prescribed fire activities to monitor the various values (Appendix M). After each prescribed burn a permanent record will be made for filing which will include all pertinent information about the burn, including the objectives, post burn aspect, weather, fire

behavior, etc.

XII. ADDITIONAL OPERATIONAL ELEMENTS

A. Public Safety

Public safety issues are primarily related to traffic in the vicinity of wildfire control and prescribed burning activities. Because most lands of the Complex are isolated, have few or no nearby human residences, have low levels of public use and incidents of fire, the public is unlikely to be directly endangered by fires on Service lands. The Fire Management Plan will complement the Safety Plan by giving guidance on safe conduct on both planned and unplanned fires.

The primary public safety concern related to fire on the Complex is traffic on Bootlegger Trail. Bootlegger Trail is a paved highway which crosses three miles of the Refuge's eastern edge. It has a moderate amount of traffic. The primary danger is that of traffic accidents which might occur when vehicles are driven into smoke from nearby fires or when there is vehicle congestion on the roadway due to presence of fire response vehicles. When fires occur, either planned or unplanned, and there is a threat or actual visibility reducing smoke on the highway, refuge staff, when available, should immediately respond in appropriate dress and with the necessary equipment to warn drivers approaching the area of the danger. In instances of wildfire this duty should be turned over to the County Sheriff's Department as soon as possible.

A second area of public safety concern relates to the presence of visitors on the Refuge Auto Tour Route if a fire were to occur. Although traffic levels and vehicle speeds are very low, there remains a danger of accidents if there is uncontrolled public access during fire activity. If there is a wildfire which has potential for approaching the Auto Tour Route or for obscuring visibility along it, the tour route will be closed. A Refuge employee will be dispatched to find any visitors on the tour route and escort them to safety or ensure they remain in a safe place until the danger is past.

Another concern is the presence of hunters in areas of tall dense cured fine fuels during the fall bird hunting seasons. Although most hunting activity occurs in marshes where there is an abundance of water, there remains the possibility of entrapment. Extremely fast moving fire fronts can be carried by strong winds through dense vegetation across standing water. If fires occur in which this circumstance can arise, Complex staff will attempt, where possible, to contact hunters or use other methods to warn or remove the hunters from danger.

A similar concern relates to volunteers who often appear at wildfire scenes to assist in the fire suppression effort. They are often unfamiliar with the terrain, fuels or proper fire suppression methods. In cooperation with county fire departments which are assisting with the fire suppression effort, Complex staff will attempt to keep the fire scene clear of unauthorized personnel.

B. Public Information and Education

Informing and educating the public about firefighting, fire prevention and the role of fire in natural ecosystems is an important part of the fire management program. Local television stations and newspapers have shown a keen interest in fires. On wildfires the Project Manager or his designee will be the primary point of contact for press and public information. Prescribed burns offer an opportunity for the station to explain the effects of fire and the purpose for planned burns. These efforts will strengthen the public perception of the Service's capability to safely conduct prescribed fire activities and increase acceptance of the program. The Project Manager, the Burn Boss, or other Service employee may be designated as the primary contact for prescribed burns.

C. Records and Reports

Fire reports (DI-1202) will be completed for prescribed burns and for all wildfires known to have occurred on Service lands, including false alarms and natural out. The Incident Commander will complete the Fire Report (DI-1202) and time reports for all Service staff and Emergency Firefighters assigned to the fire. Fire numbers will be obtained from the Zone Fire Management Officer. All expenses and/or items lost will be listed on the DI-1202 and requisition(s) will be completed and submitted to the Administrative Assistant for processing. The DI-1202's will be submitted to the Zone FMO within 3 working days after the fire is declared out who will enter the data in the Fire Management Information System. The Zone FMO will be available to assist the Complex timekeeper concerning hours and premium pay to be charged to the fire and ensure expended supplies are replaced.

D. Fire Critique and Review Process

Prior to the beginning of each fire season, this plan will be reviewed by all Complex staff members. At this time updates will be made to Appendices containing employee contact lists and staff qualifications. Other pen and ink changes can be made to the body of the plan. Changes in the plan that result in changes in philosophy or objectives are to be forwarded to the Regional Fire Management Officer for formal review and approval.

At the conclusion of each fire season the staff will meet to review this fire management plan and to review prevention, preparedness, suppression, and prescribed fire operations during the prior fire season. Discussions will include development of strategies for improving operations and plans for prescribed burning in the coming year.

The Regional Fire Management Coordinator and/or the Zone FMO will conduct a formal fire critique if:

- # There was a significant fire related accident, injury or fatality
- # There was significant property or resource damage
- # Fire shelters were deployed.(Entrapment investigation also initiated)
- # A prescribed fire was declared a wildfire
- # Significant safety concerns are raised.

XIII. CULTURAL RESOURCES AND SECTION 106 CLEARANCES

Fire Management activities at the Refuge will be implemented in accordance with the regulations and directions governing the protection of cultural resources as outline in Departmental Manual Part 519, Code of Federal Regulations (36 CFR 800), the Archeological Resources Protection Act of 1979, as amended, and the Archeological and Historic Preservation Act of 1974. All fire management activities will be in compliance with Section 106 of the National Historic Preservation Act of 1966, as ammended.

A formal inventory of the Refuge and WMD has not been completed, therefore, the extent of cultural resources is not known. There is one site listed on the National Register of Historic Places, an old wagon route. According to the form nominating the site, the route is difficult to distinguish on the ground and may be damaged by moving equipment across it.

Currently wildfires are suppressed. However, historical evidence demonstrates that natural and artificial fires were regular events in the mixed grass prairie. In recent years, fire suppression has resulted in a steady buildup of grassland and riparian fuel loads, colonization of disturbed soils by invading plant species, and natural vegetative growth, increasing the chances of an uncontrolled wildfire that could potentially endanger the Refuge's cultural resources as well as surrounding private property. Although over 20 years of fire ecology research allows ecologists to predict impacts on biotic communities, the possible impacts of prescribed burning (and wildfires) on archeological resources are not well known. Research conducted in North Dakota indicated that fire-related impacts to buried artifacts are negligible, but effects on surface-exposed artifacts will be significant, depending on artifact type and size (Seabloom et al 1991).

Impacts to archeological resources by fire resources vary. The four basic sources of damage are (1) fire intensity, (2) duration of heat, (3) heat penetration into soil, and (4) suppression actions. Of the four, the most significant threat is from equipment during line construction for prescribed fires or wildfire holding actions (Anderson 1983).

The following actions will be taken to protect archeological and cultural resources:

- ! Files and records of cultural resources should be consulted by the staff when planning prescribed burns, developing pre-attack plans, and performing other

preparedness actions. The potential for adverse impacts to cultural resources will be evaluated prior to prescribed burning and in the selection of fire suppression strategies during wildfires.

- ! The Regional Archeologist will be contacted during the development phase of the burn plan writing process when cultural resources are suspected or known to exist in the project area.
- ! The Montana State Historic Preservation Officer (SHPO) will be contacted by the Regional Archeologist when it is known a planned management action may impact archeological or cultural resources. The SHPO has 30-days to respond. The Refuge will follow any programmatic archeological/cultural resources management plan that may be implemented in the future.
- ! Low impact wildfire suppression tactics (cold-trailing, use of foam/wet-water/water, use of natural and manmade barriers, change in vegetation, mowing, etc.) will be used to the fullest extent possible. Line construction for prescribed fire activities will follow the same principle. Maps indicating the known location of significant cultural resources will be consulted prior to laying out burn units, and whenever possible, before constructing fireline to halt the spread of a wildfire.
- ! Prescriptions for management ignited prescribed fires will take into account the presence of known cultural sites. Cooler fires with short residence time will be used in areas containing known cultural sites, whenever possible.
- ! Known surface sites will be marked, protected, and excluded from the burn, if possible. Foam will not be used in areas known to harbor surface artifacts.
- ! The use of mechanize equipment within the refuge must be approved by the Refuge Manager on a fire by fire basis, and the use these resources will be considered in the approval process for any planned management actions. When the use of heavy equipment is authorized, its use will be monitored.
- ! The location of sites discovered as the result of fire management activities will be reported by the Project Manager to the Regional Archeologist.
- ! Rehabilitation plans will address cultural resources and will be reviewed by the Regional Archeologist.

XIV. AIR QUALITY AND SMOKE MANAGEMENT GUIDELINES

The Refuge and WMD occupy Montana Airsheds 6 and 9. Clear air and long distance visibility are highly prized as part of the Montana landscape. Protection of these values must be given high consideration in fire management planning and operations. Smoke from wildland fires is a recognized health concern for firefighters. Incident commanders and Burn Bosses must plan to minimize exposure to heavy smoke by incorporating the recommendations outlined in the publication Health Hazards of Smoke (Sharkey 1997). Sensitive areas will be identified and precautions taken to safeguard visitors and neighbors. Federal and State smoke management regulations and guidelines will be adhered to when planning and conducting prescribed fire in the Complex.

The Service is a member of the State Airshed Group and a signatory of the Montana Smoke Management Memorandum of Agreement of 1988. The portion of the Complex east to the Continental Divide is in Airshed 9 while the tracts west of the Divide are in Airshed 6. One of the conditions of the Agreement is that prior to September 1 each year, the refuge staff submit plans for fall and winter prescribed burns. Refuge burning plans are submitted to the Zone Fire Management Officer.

XV. FIRE RESEARCH NEEDS

There are no ongoing fire research projects in progress or planned in the Complex. If research needs or opportunities develop in the future, this plan will be amended to accommodate the occasion.

A fire effects monitoring plan is being developed and will be attached as an appendix to this Plan. Monitoring of fire effects will become an integral part of habitat monitoring at the Complex.

XVI. CONSULTATION AND COORDINATION

Cooperators and other interested parties will be provided a copy of this plan for review and comment.

The following employees of the U.S. Fish and Wildlife Service assisted in the preparation of this Plan:

Carl Douhan, Prescribed Fire Specialist, Mountain-Prairie Region

Robert F. Johnson, Wetland District Manager, Benton Lake Wetland Management District

Stephen J. Martin, Assistant Refuge Manager, Benton Lake National Wildlife Refuge

James E. McCollum, Refuge Manager, Benton Lake National Wildlife Refuge

Steve Nurse, Fire Management Officer, C.M. Russell National Wildlife Refuge

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ATTACHMENT: ENVIRONMENTAL ASSESSMENT

APPENDIX A: GOALS AND OBJECTIVES

APPENDIX B: STAFF QUALIFICATIONS

Name	Title	Employment Status	Wildfire Qualification	Prescribed Fire Qualification
James McCollum	Project Manager	Permanent/ Full Time	ENOP FFT2	RXB2 FFT2
Steve Martin	Assistant Refuge Manager	Permanent/ Full Time	N/C	FFT2
Gary Sullivan	Assistant Refuge Manager	Permanent/ Full Time	N/C	FFT2
Gale Brewer	Maintenance Worker	Permanent/ Full Time	N/C	ENOP
Bob Johnson	Assistant Refuge Manager	Permanent/ Full Time	ENOP	ENOP FFT2
Jim Stutzman	Private Lands	Permanent/ Full Time	N/C	FFT2
Greg Neudecker	Private Lands	Permanent/ Full Time	N/C	FFT2
Lyn Crete	Admin Officer	Permanent/ Full Time	N/C	N/C
Mindy Meade	Office Assistant	Permanent/ Full Time	N/C	N/C

APPENDIX C: FIRE AGREEMENTS

APPENDIX D: NORMAL UNIT STRENGTH

Normal Unit Strength (NUS) is the amount of non-capitalized fire fighting equipment needed by a refuge to meet 70 percent of suppression needs.

Table 1: Equipment

Item	Year Purchased	percent of Fire Funding	Have	GVW	Need	GVW
Engine Modules						
Medium (200-400 gallon) Truck w/Flatbed Chevy 3500	1999	0%	1		1	18k
Slip-on Unit(s) Bean Spray Unit - 200 gallon	1987 1979	100%	1 1			
Water Tender - 3000 gallon	1972		1			

Portable Pump(s) Standard (5 hp - 30 gpm) Flot-a-pump	1975 1991	100%	1 1		1	
Power saw(s)						
Mower(s)						
Tractor(s)						
ATV(s)						
Grader(s)						

Plow Unit/Disk						
Other (List)						
Other Equipment Available for Fire Suppression or Prescribed Fire operations Not Fire Funded			Use the table to the left to list capital equipment used for preparedness and initial attack or for prescribed fire activities funded wholly or in part by fire.			
Road Grader, 12' blade, A. Chalmers Series B			In the above table, Indicate the year purchased, if known, and the percent of fire funding (e.g.: The station purchased a tractor. Fire paid 25% and the station secured other funding for the remainder. Radios are listed on a separate inventory			
Bulldozer, 12' blade, Model 750 John Deere						
Tractor, Farm. Ford Model 4600						

Table 2: Cache Inventory

Item Description	Number Needed	Number on hand
Rations	90	
Hard hats	8	8
Fire Shelters	8	8
Head lamps	8	8
Canteens	8	16
Gloves	8	20
First Aid Kits	8	10

Pack Sacks	8	8
Sleeping Bags	8	3
Batteries, "D" cell	96	48
Shirt, fire retardant	12	12
Trousers or coverall, fire retardant	12	12
Shovels	6	6
Pulaskis	6	6
Fire Swatters	6	6
McLeods	6	6
Axes	3	3
Backpack pumps	3	4
Portable pumps	2	2
Hose, 3/4 inch	100'	100
Hose, 1.5 inch	100'	100
Nozzles, 1.5 X 3/8		1
Nozzles, 3/4 X 1/4		1

APPENDIX E: EXEMPTION TO ARDUOUS DUTY FITNESS REQUIREMENT

APPENDIX F: CONTACT NUMBERS

U.S. Fish and Wildlife Service	Business Phone	Home Phone
James McCollum, Project Manager	(406)727-7400	(406)453-3333
Steve Martin, Assistant Refuge Manager	(406)727-7400	(406)452-7910
Bob Rebarchik, Zone Fire Management Officer	(406)329-4749	(406)626-4654
Phil Street, Regional Fire Management Coordinator	(303)236-8145	(303)933-6851
Jim Kelton, Regional Prescribed Fire Specialist	(303)236-8145	(303)978-1349

Interagency Cooperators	Business Phone	Home Phone
Black Eagle Volunteer Fire Department Don Heffe - Chief Don Petrini - Assistant Chief	(406)761-7506	(406)761-9653 (406)761-3735
Cascade County Rural Fire Department Tom O'Hara - Coordinator	(406)761-6834 or 911	

City-County Health Department - Environmental Services Bruce Treis or Pete Frazier	(406)761-1190	
Cut Bank Fire Department (Glacier County, Peterson WPA)	911	
Cut Bank Sheriff's Department (Glacier County, Peterson WPA)	(406)873-2711	
Malstrom Air Force Base Jack L. Mitchell - Fire Chief	(406)731-3745 (406)731-3746 (406)731-3747 (406)731-4117	
National Weather Service - Forecast Recording - Meteorologist	(406)453-5469 (406)453-2081	

Powell County - Lincoln Fire Department (Blackfoot WPA) - Sheriff's Department	(406)362-9461 (406)362-4344	
U.S. Forest Service - Great Falls Interagency Dispatch Center	(406)791-7707	

APPENDIX G: FITNESS TESTING

APPENDIX H: STEP-UP PLAN

RESERVED

APPENDIX I: DISPATCH PLAN

1. When smoke or fire is reported on or adjacent to Service lands, the following information should be collected:
 - a. Location of smoke or fire
 - b. Location of caller
 - c. Name and telephone number of caller
 - d. Color of smoke (white, grey, black)
 - e. Size of fire (Small, medium, large)
 - f. What is burning (Grass, wetland vegetation, brush, trees)
 - g. Current fire behavior - smoldering, leaping flames, running, etc.
 - h. Who is fighting the fire and the type resources on scene
 - i. Weather conditions at the fire
2. The Refuge Assistant or Dispatcher will maintain a log of radio communications (Attached)
3. Contact two members of the Fire Management Team and dispatch them to the fire. The closest member of the fire suppression team should be notified by radio or in person. Only qualified and properly equipped resources will be dispatched for any fire assignment.
4. Notify the Project Manager and other members of the suppression team.
5. In the event additional resources are needed, the IC will make the decision when to call the Fire Department and inform the Refuge Manager or Dispatcher. A Resource Order will be placed with the Great Falls Dispatch Center or local Fire Department.
6. Stay until relieved or released by the IC or Project Manager

Attachment 1: Communications Log

[illegible]

Attachment 2: Employee Contact List

NAME	HOME TELEPHONE NUMBER
James McCollum	(406)453-3333
Steve Martin	(406)452-7910

Gary Sullivan	(406)452-4623
Gale Brewer	(406)454-2893
Bob Johnson	(406)727-2930
Jim Stutzman	(406)866-3438
Greg Neudecker	(406)454-2324
Mindy Meade	(406)454-2497
Lyn Crete	(406)453-0380

WILDLAND FIRE SITUATION ANALYSIS

Incident Name:

Jurisdiction:

Date and Time Completed:

This page is completed by the Agency Administrator(s).

Section I, WFSA Information Page

- A. Jurisdiction(s): Assign the agency or agencies that have or could have fire protection responsibility, e.g., USFWS, BLM, etc.
- B. Geographic Area: Assign the recognized "Geographic Coordination Area" the fire is located in, e.g., Northwest, Northern Rockies, etc.
- C. Unit(s): Designate the local administrative unit(s), e.g., Hart Mountain Refuge Area, Flathead Indian Reservation, etc.
- D. WFSA #: Identify the number assigned to the most recent WFSA for this fire.
- E. Fire Name: Self-explanatory.
- F. Incident #: Identify the incident number assigned to the fire.
- G. Accounting Code: Insert the local unit's accounting code.
- H. Date/Time Prepared: Self-explanatory.
- I. Attachments: Check here to designate items used to complete the WFSA. "Other" could include data or models used in the development of the WFSA. Briefly describe the "other" items used.

I. Wildland Fire Situation Analysis		
To be completed by the Agency Administrator(s)		
A. Jurisdiction(s)	B. Geographic Area	
C. Unit(s)	D. WFSA #	
E. Fire Name	F. Incident #	
G. Accounting Code:		
H. Date/Time Prepared _____ @ _____		
I. Attachments		
- Complexity Matrix/Analysis *	_____	
- Risk Assessment/Analysis *	_____	

Probability of Success *	_____	
Consequences of Failure *	_____	
- Maps *	_____	
- Decision Tree **	_____	
- Fire Behavior Projections *	_____	
- Calculations of Resource Requirements *	_____	

culturally sensitive areas, irreparable damage to resources or smoke management/air quality concerns. Economic constraints, such as public and agency cost, could be considered here.

II.	Objectives and Constraints
To be Completed by the Agency Administrator(s)	

A. Objectives (Must be specific and measurable)

1. *Safety*

- Public

- Firefighter

2. *Economic*

3. *Environmental*

4. *Social*

5. *Other*

B. Constraints

This page is completed by the Fire Manager and/or Incident Commander.

Section III. Alternatives

- A. Wildland Fire Management Strategy: Briefly describe the general wildland fire strategies for each alternative. Alternatives must meet resource management plan objectives.
- B. Narrative: Briefly describe each alternative with geographic names, locations, etc., that would be used when implementing a wildland fire strategy. For example: "Contain within the Starvation Meadows' watershed by the first burning period."
- C. Resources Needed: Resources described must be reasonable to accomplish the tasks described in Section III.B. It is critical to also look at the reality of the availability of these needed resources.
- D. Final Fire Size: Estimated final fire size for each alternative at time of containment.
- E. Estimated Contain/Control Date: Estimates of each alternative shall be made based on predicted weather, fire behavior, resource availability, and the effects of suppression efforts.
- F. Cost: Estimate all incident costs for each alternative. Consider mop-up, rehabilitation, and other costs as necessary.
- G. Risk Assessment - Probability of Success/Consequences of Failure: Describe probability as a percentage and list associated consequences for success and failure. Develop this information from models, practical experience, or other acceptable means. Consequences described will include fire size, days to contain, days to control, costs, and other information such as park closures and effect on critical habitat. Include fire behavior and long-term fire weather forecasts to derive this information.
- H. Complexity: Assign the complexity rating calculated in "Fire Complexity Analysis" for each alternative, e.g., Type II, Type I.
- I. A map for each alternative should be prepared. The map will be based on the "Probability of Success/Consequences of Failure" and include other relative information.

III. Alternatives (To be completed by FMO / IC)			
	A	B	C
A. Wildland Fire Strategy			
B. Narrative			

C. Resources needed Handcrews Engines Dozers Airtankers Helicopters	 	 	
D. Final Size			
E. Est. Contain/ Control Date			

F. Costs			
G. Risk Assessment - Probability of success - Consequence of failure	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>
H. Complexity			
I. Attach maps for each alternative			

This page is completed by the Agency Administrator(s), FMO and/or Incident Commander.

Section IV. Evaluation of Alternatives

- A. Evaluation Process: Conduct an analysis for each element of each objective and each alternative. Objectives shall match those identified in Section II.A. Use the best estimates available and quantify whenever possible. Provide ratings for each alternative and corresponding objective element. Fire effects may be negative, cause no change, or may be positive. Examples are: 1) a system which employs a

"-" for negative effect, a "0" for no change, and a "+" for positive effect; 2) a system which uses a numeric factor for importance of the consideration (soils, watershed, political, etc.) and assigns values (such as -1 to +1, - 100 to +100, etc.) to each consideration, then arrives at a weighted average. If you have the ability to estimate dollar amounts for natural resource and cultural values, this data is preferred. Use those methods which are most useful to managers and most appropriate for the situation and agency. To be able to evaluate positive fire effects, the area must be included in the resource management plan and consistent with prescriptions and objectives of the fire management plan.

Sum of Economic Values: Calculate for each element the net effect of the rating system used for each alternative. This could include the balance of:

pluses (+) and minuses (-), numerical rating (-3 and +3), or natural and cultural resource values in dollar amounts. (Again, resource benefits may be used as part of the analysis process when the wildland fire is within a prescription consistent with approved Fire Management Plans and in support of the unit's Resource Management Plan.)

IV. Evaluation of Alternatives			
To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander			
A. Evaluation Process	A	B	C
Safety Firefighter Aviation Public			

<i>Sum of Safety Values</i>			
<i>Economic</i> Forage Improvements Recreation Timber Water Wilderness Wildlife Other (specify)			
<i>Sum of Economic Values</i>			

<i>Environmental</i> Air Visual Fuels T & E Species Other (specify)			
<i>Sum of Environmental Values</i>			
<i>Social</i> Employment Public Concern Cultural Other (Specify)			
<i>Sum of Social Values</i>			

Other			
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This page is completed by the Agency Administrator(s) and Fire Manager and/or Incident Commander.

Section V. Analysis Summary

- A. Compliance with Objectives: Prepare narratives that summarize each alternative's effectiveness in meeting each objective. Alternatives that do not comply with objectives are not acceptable. Narrative could be based on effectiveness and efficiency. For example: "most effective and least efficient," "least effective and most efficient," or "effective and efficient." Or answers could be based on a two-tiered rating system such as "complies with objective" and "fully complies with or exceeds objective." Use a system that best fits the manager's needs.
- B. Pertinent Data: Data for this Section has already been presented, and is duplicated here to help the Agency Administrator(s) confirm their selection of an alternative. Final Fire Size is displayed in Section III.D. Complexity is calculated in the attachments and displayed in Section III.H. Costs are displayed on page 4. Probability of Success/Consequences of Failure is calculated in the attachments and displayed in Section III.G.
- C. External and Internal Influences: Assign information and data occurring at the time the WFSA is signed. Identify the Preparedness Index (1 through 5) for the National and Geographic levels. If available, indicate the Incident Priority assigned by the MAC Group. Designate the Resource Availability status. This information is available at the Geographic Coordination Center, and is needed to select a viable alternative. Designate "yes," indicating an up-to-date weather forecast has been provided to, and used by, the Agency Administrator(s) to evaluate each alternative. Assign information to the "Other" category as needed by the Agency Administrator(s).

Section IV. Decision

Identify the alternative selected. Must have clear and concise rationale for the decision, and a signature with date and time. Agency Administrator(s) is mandatory.

V. Analysis Summary			
To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander			
Alternatives	A	B	C

A. Compliance with Objectives Safety Economic Environmental Social Other			
B. Pertinent Data Final Fire Size Complexity Suppression Cost Resource Values Probability of Success Consequences of Failure			
C. External / Internal Influences National & Geographic Preparedness Level _____ Incident Priority _____ Resource Availability _____ Weather Forecast (long-range) _____ Fire Behavior Projections _____			

VI.	Decision
<p>The Selected Alternative is: _____</p> <p>Rationale:</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%; text-align: center;"> <p>_____</p> <p>Agency Administrator's Signature</p> </div> <div style="width: 45%; text-align: center;"> <p>_____</p> <p>Date/Time</p> </div> </div>	

This Section is completed by the Agency Administrator(s) or designate.

Section VII. Daily Review

The date, time, and signature of reviewing officials are reported in each column for each day of the incident. The status of Preparedness Level, Incident Priority, Resource Availability, Weather Forecast, and WFSA validity is completed for each day reviewed. Ratings for the Preparedness Level, Incident Priority, Resource Availability, Fire Behavior, and Weather Forecast are addressed in Section V.C. Assign a "yes" under "WFSA Valid" to continue use of this WFSA. A "no" indicates this WFSA is no longer valid and another WFSA must be prepared or the original revised.

Section VIII. Final Review

This Section is completed by the Agency Administrator(s). A signature, date, and time are provided once all conditions of the WFSA are met.

VIII.	Daily Review
To be completed by the Agency Administrator(s) or Designate	
Selected to be reviewed daily to determine if still valid until containment or control	

			P R E P A R E D N E S S L E V E L	I N C I D E N T P R I O R I T Y	R E S O U R C E A V A I L A B I L I T Y	W E A T H E R F O R E C A S T	F I R E B E H A V I O R P R O J E C T I O N S	W F S A V A L I D			
			Date	Time	By						

If WFSA is no longer valid, a new WFSA will be completed!

VIII. Objectives

Final Review

The elements of the selected alternative were met on: _____
Date Time

By: _____
(Agency Administrator(s))

A GUIDE FOR ASSESSING FIRE COMPLEXITY

The following questions are presented as a guide to assist the Agency Administrator(s) and staff in analyzing the complexity or predicted complexity of a wildland fire situation. Because of the time required to assemble or move an Incident Management Team to wildland fire, this checklist should be completed when a wildland fire escapes initial attack and be kept as a part of the fire records. This document is prepared concurrently with the preparation of (and attached to) a new or revised Wildland Fire Situation Analysis. It must be emphasized this analysis should, where possible, be based on predictions to allow adequate time for assembling and transporting the ordered resources.

Use of the Guide:

1. Analyze each element and check the response "yes" or "no."
2. If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.
3. If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be, Type I.

4. Factor H should be considered after all the above steps. If more than two of these items are answered "yes," and three or more of the other primary factors are positive responses, a Type I team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A-G), a Type II team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

GLOSSARY OF TERMS

Potential for blow-up conditions - Any combination of fuels, weather, and topography excessively endangering personnel.

Rate or endangered species - Threat to habitat of such species or, in the case of flora, threat to the species itself.

Smoke management - Any situation which creates a significant public response, such as smoke in a metropolitan area or visual pollution in high-use scenic areas.

Extended exposure to unusually hazardous line conditions - Extended burnout or backfire situations, rock slide, cliffs, extremely steep terrain, abnormal fuel situation such as frost killed foliage, etc.

Disputed fire management responsibility - Any wildland fire where responsibility for management is not agreed upon due to lack of agreements or different interpretations, etc.

Disputed fire policy - Differing fire policies between suppression agencies when the fire involves multiple ownership is an example.

Pre-existing controversies - These may or may not be fire management related. Any controversy drawing public attention to an area may present unusual problems to the fire overhead and local management.

Have overhead overextended themselves mentally or physically - This is a critical item that requires judgment by the responsible agency. It is difficult to write guidelines for this judgment because of the wide differences between individuals. If, however, the Agency Administrator feels the existing overhead cannot continue to function efficiently and take safe and aggressive action due to mental or physical reasons, assistance is mandatory.

FIRE COMPLEXITY ANALYSIS

A.	FIRE BEHAVIOR: Observed or Predicted	Yes/No
	1. Burning Index (from on-site measurement of weather conditions). Predicted to be above the 90% level using the major fuel model in which the fire is burning.	___ ___
	2. Potential exists for "blowup" conditions (fuel moisture, winds, etc.)	___ ___
	3. Crowning, profuse or long-range spotting.	___ ___
	4. Weather forecast indicating no significant relief or worsening conditions.	___ ___
	Total	___ ___
B.	RESOURCES COMMITTED	
	1. 200 or more personnel assigned.	___ ___
	2. Three or more divisions.	___ ___
	3. Wide variety of special support personnel.	___ ___
	4. Substantial air operation which is not properly staffed.	___ ___
	5. Majority of initial attack resources committed.	___ ___
	Total	___ ___
C.	RESOURCES THREATENED	
	1. Urban interface.	___ ___
	2. Developments and facilities.	___ ___
	3. Restricted, threatened or endangered species habitat.	___ ___
	4. Cultural sites.	___ ___
	5. Unique natural resources, special designation zones or wilderness.	___ ___
	6. Other special resources.	___ ___
	Total	___ ___
D.	SAFETY	
	1. Unusually hazardous fire line conditions.	___ ___
	2. Serious accidents or facilities.	___ ___
	3. Threat to safety of visitors from fire and related operations.	___ ___

4.	Restricted and/or closures in effect or being considered.	_____	_____	_____
5.	No night operations in place for safety reasons.	_____	_____	_____
		Total	_____	_____
E.	OWNERSHIP		Yes/No	
1.	Fire burning or threatening more than one jurisdiction.	_____	_____	_____
2.	Potential for claims (damages).		_____	_____
3.	Conflicting management objectives.		_____	_____
4.	Disputes over fire management responsibility.		_____	_____
5.	Potential for unified command.		_____	_____
		Total	_____	_____
F.	EXTERNAL INFLUENCES			
1.	Controversial wildland fire management policy.	_____	_____	_____
2.	Pre-existing controversies/relationships.		_____	_____
3.	Sensitive media relationships.		_____	_____
4.	Smoke management problems.		_____	_____
5.	Sensitive political interests.		_____	_____
6.	Other external influences.		_____	_____
		Total	_____	_____
G.	CHANGE IN STRATEGY			
1.	Change in strategy to control from confine or contain.		_____	_____
2.	Large amount of unburned fuel within planned perimeter.		_____	_____
3.	WFSA invalid or requires updating.		_____	_____
		Total	_____	_____
H.	EXISTING OVERHEAD			
1.	Worked two operational periods without achieving initial objectives.	_____	_____	_____
2.	Existing management organization ineffective.		_____	_____
3.	IMT overextended themselves mentally and/or physically.		_____	_____

4. Incident action plans, briefings, etc., missing or poorly prepared. ____ ____

Total ____ ____

Signature_____

Date_____ **Time**_____

APPENDIX K: SAMPLE COUNTY BURN PERMIT

APPENDIX L: COMPLEXITY

Prescribed Fire Complexity Worksheet

Using the attached criteria, rate each element on a scale of 0 to 9, then multiply by the weighting factor (shown in parentheses in first column) to determine the weighted subvalues. Add the subvalues to determine the total weighted value which is used to determine the complexity of the prescribed burn.

PRESCRIBED FIRES:

COMPLEXITY ELEMENT/ (WEIGHTING FACTOR)	RATING VALUE	WEIGHT SUBVALUE	LOW BURN COMPLEXITY	HIGH BURN COMPLEXITY
1. Potential for escape (10)			Very low probability.	High probability.
2. Values at risk (10)			Very little risk to people, property, resources.	Great risk to people, property, resources.
3. Fuels/fire behavior (6)			Mostly uniform and predictable.	Great variability & unpredictability. Prescription includes very low fuel moisture conditions.
4. Fire duration (7)			Fire generally of short duration & require little management.	Fires of long duration & require continuous management.
5. Smoke/air quality (7)			Smoke impacts are low or insignificant.	Smoke sensitive areas frequently affected.
6. Ignition methods (3)			Simple & rarely hazardous.	Highly technical or frequently hazardous.
7. Management team size (3)			Burn requires a few generalized positions.	Burn requires large team of separate, specialized positions.
8. Treatment objectives (5)			Objectives simple & easy to achieve. Prescriptions are broad & encompass safe burning conditions.	Objectives are difficult to achieve. Prescriptions are restrictive or burning conditions are risky.
Total Weighted Value:				

Low Complexity: 50 - 115 Total Weighted Value Points - Management Level: RXB3
 Normal Structure: 116 - 280 Total Weighted Value Points - Management Level: RXB2
 Complex Structure: 281 - 450 Total Weighted Value Points - Management Level: RXB1

Prepared by (RXBB/FMO)

Date

PREScribed FIRE COMPLEXITY ELEMENT RATING CRITERIA

Complexity elements are used to define the relative complexity of a prescribed fire project. For the 8 complexity elements listed, users assign a complexity score of 0, 1, 3, 5, 7 or 9, based upon the rating criteria described for each numeric score. Even numbers or numbers greater than 9 are not permitted. If a specific prescribed burn does not precisely match the stated criteria in every respect, a station will have to use its best judgment determine which rating is most appropriate. Each prescribed burn does not have to meet all listed rating criteria for a particular numeric score to qualify for that rating. Each higher rating category includes all the rating criteria listed for the previous categories.

These rating criteria will be used for all management ignited prescribed fires (prescribed burns), regardless of size. The complexity score will be included on the Fire Report (DI-1202) in the "Remarks" section. Post-fire complexity ratings are used to compile a summary complexity score for the normal prescribed fire year, which is used in the FIREPRO budget analysis for funding and staffing needs.

COMPLEXITY ELEMENTS

1. POTENTIAL FOR ESCAPE:

Score Criteria

- | | |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [0] | No potential for prescribed fire escape. Burn unit surrounded by non-burnable fuel or water. |
| [1] | Little potential of spot fires outside burn unit. If occurring, only one to two totaling no more than 0.25 acre. Spots can be controlled utilizing on-site holding forces. |
| [3] | Potential for multiple spot fires (more than two) outside the burn unit totaling less than 1 acre, but still controllable utilizing on-site holding resources. One or two dangerous fuel concentrations exist near the burn unit perimeter, and are expected to result in limited torching and spotting potential. |
| [5] | Potential for multiple spot fires outside the burn unit totaling more than 1 acre, requiring greater than average holding capability along certain sections of burn perimeter. Additional holding resources may be needed to control if escape occurs. Fuel outside burn unit is continuous, with limited fuel breaks. Engines and heavy equipment are primary suppression tools. |
| [7] | An escaped fire will exceed the capability of the holding resources on site. Additional resources will need to be requested for suppression. Escaped fire will cause implementation of contingency plan, and prescribed burn will be declared a wildfire. Fuel outside burn unit may be continuous and heavy with no fuel breaks making suppression efforts difficult. Engines and heavy equipment are primary suppression tools. Probability of Ignition greater than 70 percent. |
| [9] | Good potential for multiple fire escapes. An escaped fire will exceed the capability of the holding resources on site and additional resources will need to be requested. Escaped fires will cause implementation of contingency plan and prescribed burn will be declared a wildfire. Fuel outside the burn unit is extensive and heavy, making suppression actions difficult. Prescription calls for |

fireline intensity and fuel moisture in the primary fuel model that are known to cause serious spotting potential. Probability of Ignition greater than 85 percent. Wind speeds at the upper end of prescription.

2. VALUES AT RISK

<u>Score</u>	<u>Criteria</u>
--------------	-----------------

- | | |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [0] | No risk to people, property, cultural and natural resources, either inside the designated burn unit or in the event of fire escape. |
| [1] | Burn is in an area infrequently visited by people and contains no historic structures, buildings, sensitive biological communities, T&E species, or habitats that could be damaged by prescribed fire. The area adjacent to the burn may contain a few locally significant natural or cultural resources, or structures that could be damaged by fire escapes. |
| [3] | Burn is in an area occasionally visited by people, and may be adjacent to a primary field unit road. The burn unit contains structures, cultural resources, sensitive biological communities, or T&E habitat that must be protected from fire. |
| [5] | Burn is in an area that receives moderate use. Public safety is a major concern addressed in the burn unit plan, but still requires a minor commitment of project resources. The unit may contain several significant structures; there may be one or two primary natural or cultural resources (as identified in the station fire management plan) inside or immediately adjacent to the burn unit which must be protected from fire. - OR - the area adjacent to the burn unit contains one or two cultural or natural resources, or structures valued between \$50,000 and \$250,000 that could be threatened by fire escapes. |
| [7] | Burn is in an area that receives moderate use, and protecting public safety requires a modest commitment of project resources. The burn unit may contain several significant structures, and contain or be immediately adjacent to several sensitive biological communities or habitats (as identified in station fire management plan) that must be protected from fire. - OR - the area adjacent to the burn unit contains three or more cultural or natural resources or developed sites with structures valued between \$250,000 and \$500,000 that could be threatened by fire escapes. |
| [9] | The burn unit is in an area of concentrated public use, and protecting public safety requires a major commitment of project resources. The unit may contain several major structures (such as residences, historic buildings) and there may be critical natural or cultural resources (such as threatened or endangered species, or major archeological artifacts) inside the burn unit that must be protected from fire. - OR - the area adjacent to the burn unit contains critical natural or cultural resources or developed sites with structures valued at more than \$500,000. |

3. FUELS/FIRE BEHAVIOR

<u>Score</u>	<u>Criteria</u>
--------------	-----------------

- [1] Fuels are uniform, and fire behavior is easily predicted using the standard fire behavior models and prediction systems (BEHAVE PROGRAM). Terrain is mostly flat, or the slope is uniform.

- [3] Fuels within the primary model vary somewhat in loadings and arrangement, but are still well represented by one of the standard fire behavior fuel models. There may be small areas of secondary fuel types present, mostly away from the burn unit perimeter. The terrain contains low relief, and slope and aspect cause minor variations in fire behavior. The fire behavior variations present no difficulties in carrying out the burn, and the predominant fire behavior still can be predicted easily under most prescription conditions.

- [5] Considerable variation exists within the primary fuel complex. Prescriptions may be based on two fuel models, or may require a customized model in addition to or in place of a standard model. A few areas of unusual fuel concentrations or atypical fuels not well represented by the prescription-based models may exist on or near the burn unit perimeter. The terrain contains significant relief, but the variations present only minor control problems, and no problems in meeting burn unit objectives. Fire behavior can still be predicted using standard fire behavior prediction systems.

- [7] Major variations in the fuel complex require **two or more** fuel models, and may require several customized models. High fuel concentrations and atypical fuels not well represented by the prescription-based models may be common on or near the burn unit perimeter. The terrain encompasses two or three major vegetative communities through a broad elevational gradient. Variations in slope and aspect have major effects on fuels, fire weather and fuel moisture. The resulting variations in fire behavior may present moderate fire control problems and minor problems in meeting the overall burn unit objectives. Fire behavior cannot be predicted well using standard fire behavior prediction systems without application of adjustment factors.

- [9] The burn unit contains highly variable fuels throughout, making it difficult to utilize standard or customized fuel models. The terrain encompasses more than three major vegetative communities through an elevation gradient so broad that more than one climate zone may be present. Wide variations in slope, aspect and elevation have major effects on fuels, fire weather and fuel moisture. The resulting variations in fire behavior may present major fire control problems and moderate problems in meeting overall burn unit objectives. Fire behavior cannot be predicted well without the aid of local experts (Fire Behavior Analysis).

4. FIRE DURATION

Score Criteria

- [1] Entire burn unit will be burned in one burning period. Some minor residual burning may continue inside the unit, but requires no continued resource commitment. Primarily 1-hour fuels.

- [3] Complete burnout of burn unit requires 1 to 3 days. Some minor residual burning may continue inside the unit, but requires no continued resource commitment. Primarily 10-hour fuels.

- [5] Complete burnout of burn unit requires 2 to 3 days. Significant residual burning inside the burn perimeter may continue for up to 3 days, requiring small holding crew. Primarily 100-hour fuels.

- [7] Complete burnout of burn unit requires 3 days to 1 week. Significant residual burning inside the burn perimeter may continue up to another week, requiring a holding crew on site during the burning period. Primarily 1,000-hour fuels.
- [9] Complete burnout of burn unit requires more than 1 week. Significant residual burning may continue for up to another 3 weeks along most of the burn unit perimeter, requiring a complete holding crew on site.

5. AIR QUALITY

Score Criteria

- [1] Burn is remote from developments or visitor use areas or is of such small size that smoke impacts are insignificant. No critical targets are present. Critical targets are areas that are unusually sensitive to smoke impacts. These include areas such as airports, highways, air quality non-attainment areas, and hospitals in which health and safety are quickly and severely impacted by even minimal amounts of smoke, targets that already have an air pollution or visibility problem, and any targets where the impact of smoke will be compounded by the presence of emissions from other sources. Burning is outside the non-attainment areas, and RACM/BACM eliminates any impacts to these areas.
- [3] One or more minor developments or visitor use areas may experience noticeably impaired visibility and increased particulate concentrations, but not in excess of secondary Federal standards. The impairment is expected to last no more than 3 days. No critical targets are present. There are no impacts to non-attainment areas.
- [5] Several communities or visitor use areas may experience significantly impaired visibility (as defined in State, county, or field station visibility standard) or particulate concentrations exceeding secondary Federal standards. The impairment is expected to last no more than 1 week. Not more than one health-related complaint is likely to be received from health or medical authorities. No critical targets are present. Smoke trajectory is important, but broad.
- [7] One town (more than 20,000 people) or one major visitor use area may experience significantly impaired visibility (as defined in a State, county or field station visibility standard) or particulate concentrations exceeding secondary Federal standards. The impairment is expected to last not more than 1 week. One to three critical targets are present. Smoke trajectory is critical. Mixing height and transport wind speed may be important.
- [9] Several towns (each of 20,000 people or more) or several major visitor areas may experience significantly impaired visibility (as defined in State, county or field station visibility standard) or particulate concentrations exceeding secondary Federal standards. The impairment is expected to last more than 1 week. Any impact likely to result in a violation of a primary Federal air quality standard would also qualify. Smoke trajectory, mixing height, and transport wind speed are critical.

6. IGNITION METHODS

<u>Score</u>	<u>Criteria</u>
[1]	Burn is ignited using drip torches, fusees, or other simple ground methods. Ignition requires not more than two personnel. Ignition patterns are simple, with no chance for confusion or hazardous situations to develop.
[3]	Burn is ignited using simple ground methods or Terra Torch device (or equivalent). Ignition requires three to four personnel who may work in small teams igniting separate areas simultaneously. Ignition patterns may be complex enough to require detailed planning, but there is only minor chance of confusion. Ignition team is not expected to become involved in hazardous situations.
[5]	Burn is ignited using a combination of ground methods, or both ground and aerial methods. Ignition requires four to six personnel working in teams to ignite separate areas simultaneously. Burn and ignition complexity requires separate position for ignition specialist. Ignition patterns require detailed planning, coordination between teams, and considerable attention to avoid confusion. Ignition teams may be exposed to hazardous situations for short periods.
[7]	Ignition methods are tailored to accomplish different results in different sections of the burn. Burn unit may be composed of several fuel types requiring different ignition techniques and patterns. Ignition team(s) is composed of six to eight personnel, who may ignite separate areas simultaneously. Several ignition specialists may be required for different segments of the burn. Ignition methods require detailed planning and coordination often including an ignition specialist in aerial command post. Ignition teams are frequently exposed to hazardous situations due to fuels, fire line intensity, and complex terrain. Ignition methods or patterns are subject to revision by burn boss to achieve desired results or due to changing conditions.
[9]	Burn requires a combination of complex aerial and ground techniques, often including helitorch, in complex, hazardous terrain and fuels. Ignition team is composed of more than eight personnel. Ignition methods require detailed planning by experts with extensive experience in specialized techniques. Ignition methods are subject to frequent revision by burn and ignition bosses due to changing or uncertain conditions. Detailed coordination is imperative to avoid placing team members in unacceptably dangerous situations.

7. MANAGEMENT TEAM SIZE

<u>Score</u>	<u>Criteria</u>
[1]	Burn team consists of two to three personnel, with the burn boss holding several overhead positions.
[3]	Burn team consists of four to six personnel, including separate positions for Burn Boss and Holding Specialist.

- [5] Burn team consists of seven to nine personnel, including separate positions for Burn Boss, Ignition Specialist, and Holding Specialist.
- [7] Burn team consists of 10-12 personnel, including Burn Boss, Ignition and Holding Specialist, Aircraft Manager (aerial ignitions), and a Fire Weather Observer.
- [9] Burn team consists of more than 12 personnel, including Burn Boss Type I, Holding Boss, Ignition Specialist, Aircraft Manager, Weather Observer, and several ignition and holding foremen.

8. TREATMENT OBJECTIVES

Score Criteria

- [1] Objectives are limited to fuel reduction or maintenance burning and are easily achieved (e.g., removing cured grasses from grasslands or field maintenance). Prescriptions are broad and encompass safe burning conditions.
- [3] Objectives are limited to dead and downed fuel reduction, or simple habitat restoration projects involving minor changes to vegetation. May involve two or three different fuel models. Objectives are easy to achieve using relatively low-intensity surface fires and simple burning patterns. Range of acceptable results for the burn objectives are broad.
- [5] Objectives include dead and downed fuel, and live fuel reduction burns or change to structure of vegetative/habitat communities. Also include habitat conversion projects requiring changes in the composition of two or more vegetation types. Objectives and results are broad and could be moderately difficult to achieve, and may often require moderate intensity fires involving living fuels. Burning patterns are moderately complex. Flame lengths or scorch heights are critical to meet burn objectives.
- [7] Objectives include living and dead fuels. Include habitat restoration projects requiring changes in the structure and composition of two or more vegetative habitats. Narrow burn parameters (prescription) fire behavior, smoke dispersal, operational constraints, and other burn criteria present a limited opportunity of project success with a single burn. The chance of success is heavily dependent on careful planning and precise timing.
- [9] Objectives include living and dead fuels. Fuel reduction, ecological considerations, and political or operational constraints may be conflicting, requiring careful prioritization of objectives and expert planning. The prescription may require a combination of different fire intensities that makes it difficult to achieve objectives. The prescription criteria and window of opportunity are narrow. Burn objectives are specific, and range of results narrow. Project includes a major change in structure and composition of burn area. The prescription requires burning under risky conditions that could lead to fire escape.

APPENDIX M: MONITORING GUIDELINES

RECOMMENDED FIRE MONITORING STANDARDS

REGION 6

The following are the recommended standards to be used when planning, implementing, and evaluating prescribed burns. These should be viewed as minimum values to be monitored and the information contained in this check list incorporated into a monitoring record sheet.

Planning and Preparation

Environmental Conditions Prior to the Burn

Photo Points Established

Fuel

Model(s)

Loading (By Size Class)

% Cover (Type/Model)

Continuity

Crown ratio

Depth of Fuel Bed

Other

Air Temperature (Maximum - Minimum to develop trends)

Relative Humidity (Maximum - Minimum to develop trends)

Wind Speed and Direction (Eye-level/20 Foot)

Fuel Moisture

Dead Fuel Moisture (Use of Fuel Sticks and/or Drying Ovens highly recommended)

Live Fuel Moisture (Fuel Models 2,4,5,7,10)

Soil Moisture (Dry, Moist, Wet)

Drought Indicator (Track One or More)

Execution

Environmental Conditions During the Burn

Date/Time

Air Temperature	(Every 30 minutes)
Relative Humidity	(Every 30 minutes)
Wind Speed and Direction	(Eye Level) (Every 30 minutes)
Cloud Cover	

Fuel Moisture (Indicate How Determined: Calculated, Actual)

Dead Fuel Moisture (Using above values, calculate every 30 minutes utilizing Tables and Worksheets, Nomograms, BEHAVE, etc.)

Live Fuel Moisture (Fuel Models 2,4,5,7,10 - Collect immediately prior to the burn and evaluate later)

Fire Behavior

Flame length	(Head, Flank, Backing)
Rate of Spread	(Forward, Flank, Backing)
Resistance to Control	
Spotting Distance	

Smoke/Air Quality

Mixing/Dispersal	(Good, Fair, Poor)
Trajectory of Column	(Surface/Upper Level)
Duration	(Active Burning/Smoldering)
Problems	

Note: It is recommended that photos be taken to document smoke dispersal.

Post Burn

First Order Fire Effects

Photo Point

Percent of Area Burned

Percent of Fuels Consumed (By Fuel Loading Size Class, when possible)

Percent of Thatch/Duff Consumed

Scorch Height

Mortality

Note: The information in the first two categories will be used to determine the amount of particulate matter produced, and may/will be used by State Air Quality Regulators.

APPENDIX N: MONTANA/IDAHO AIRSHED GROUP OPERATING GUIDE